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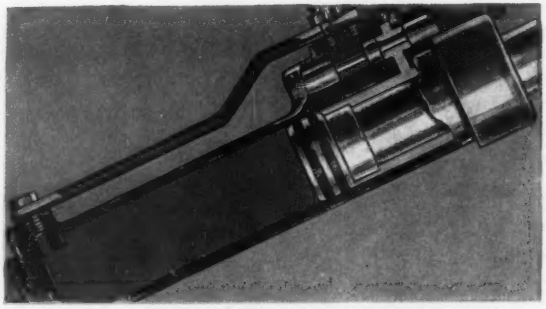

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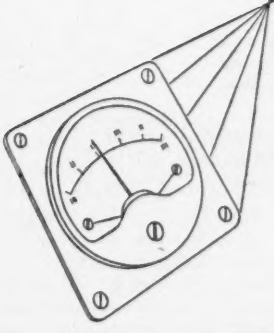

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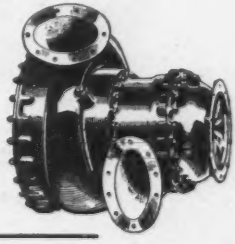

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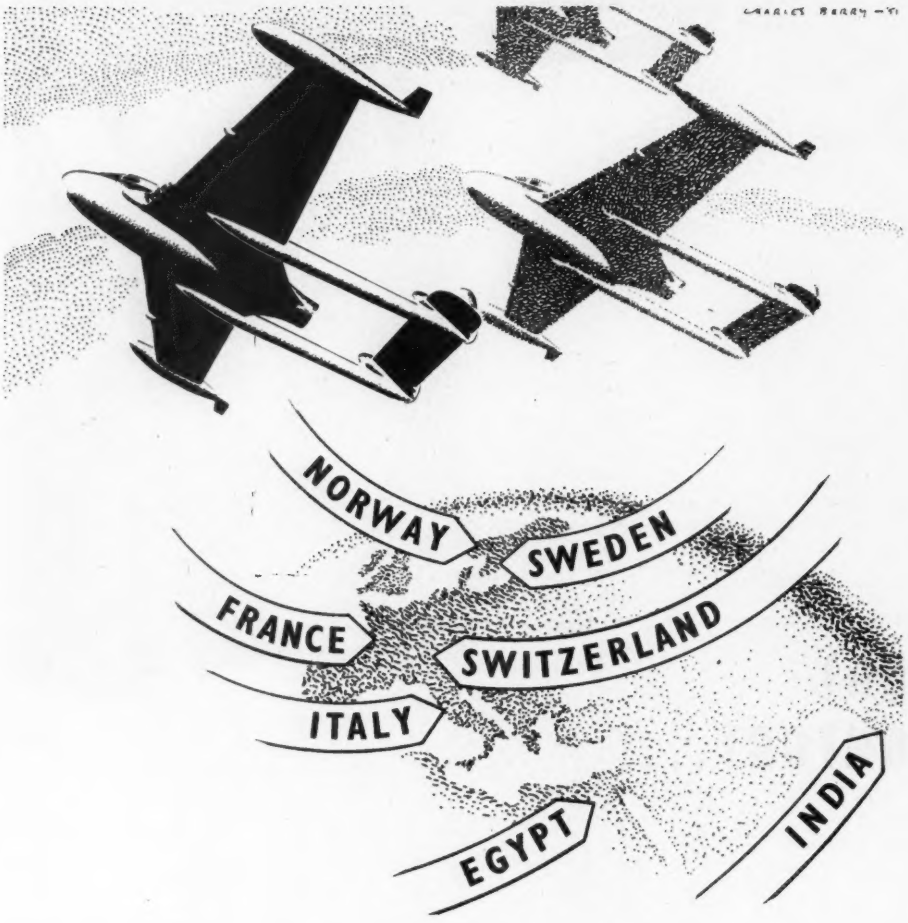

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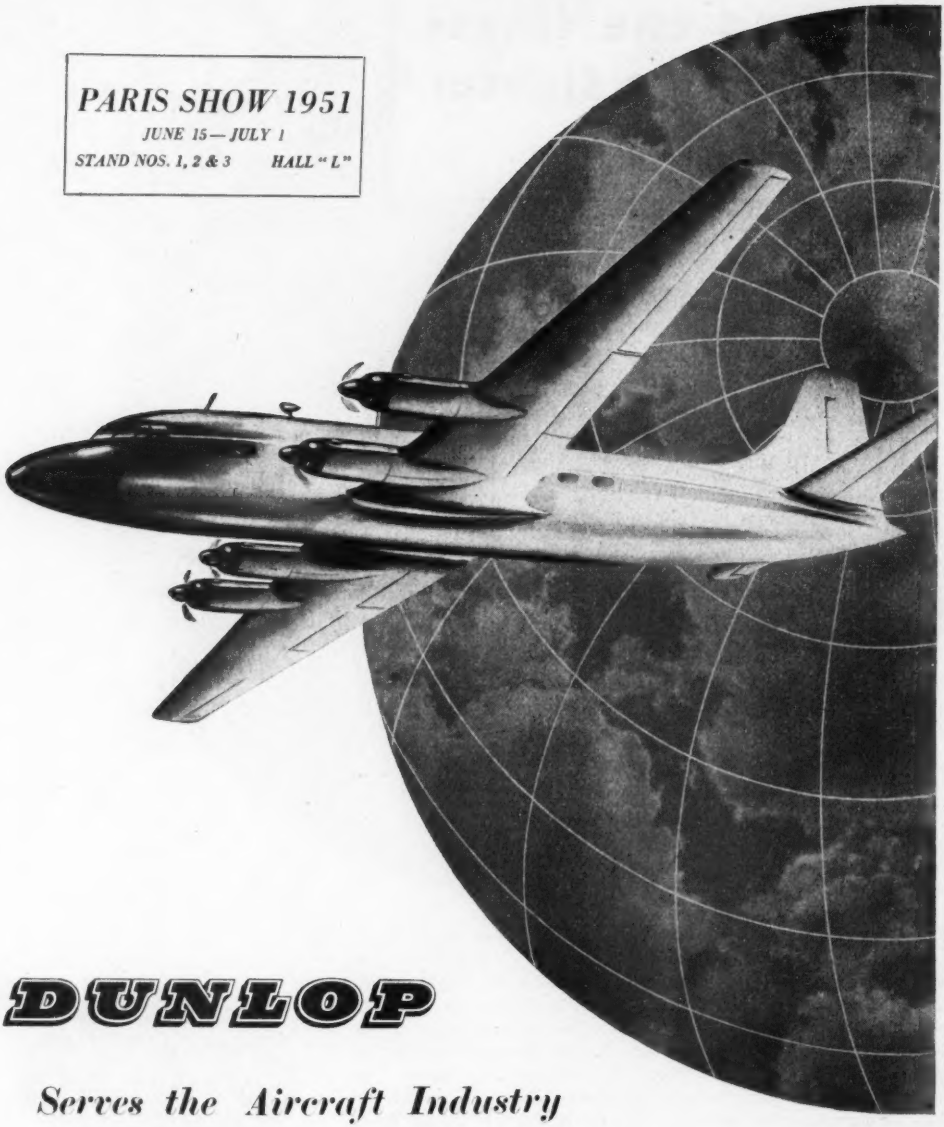

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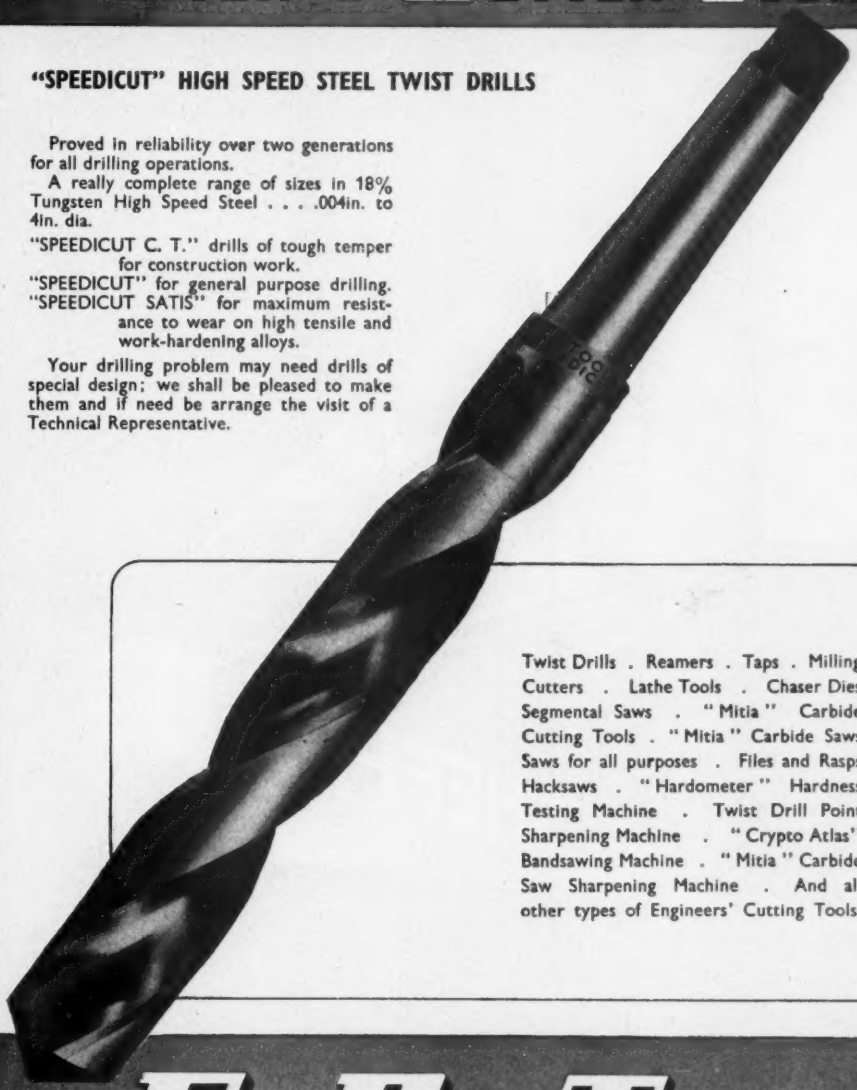

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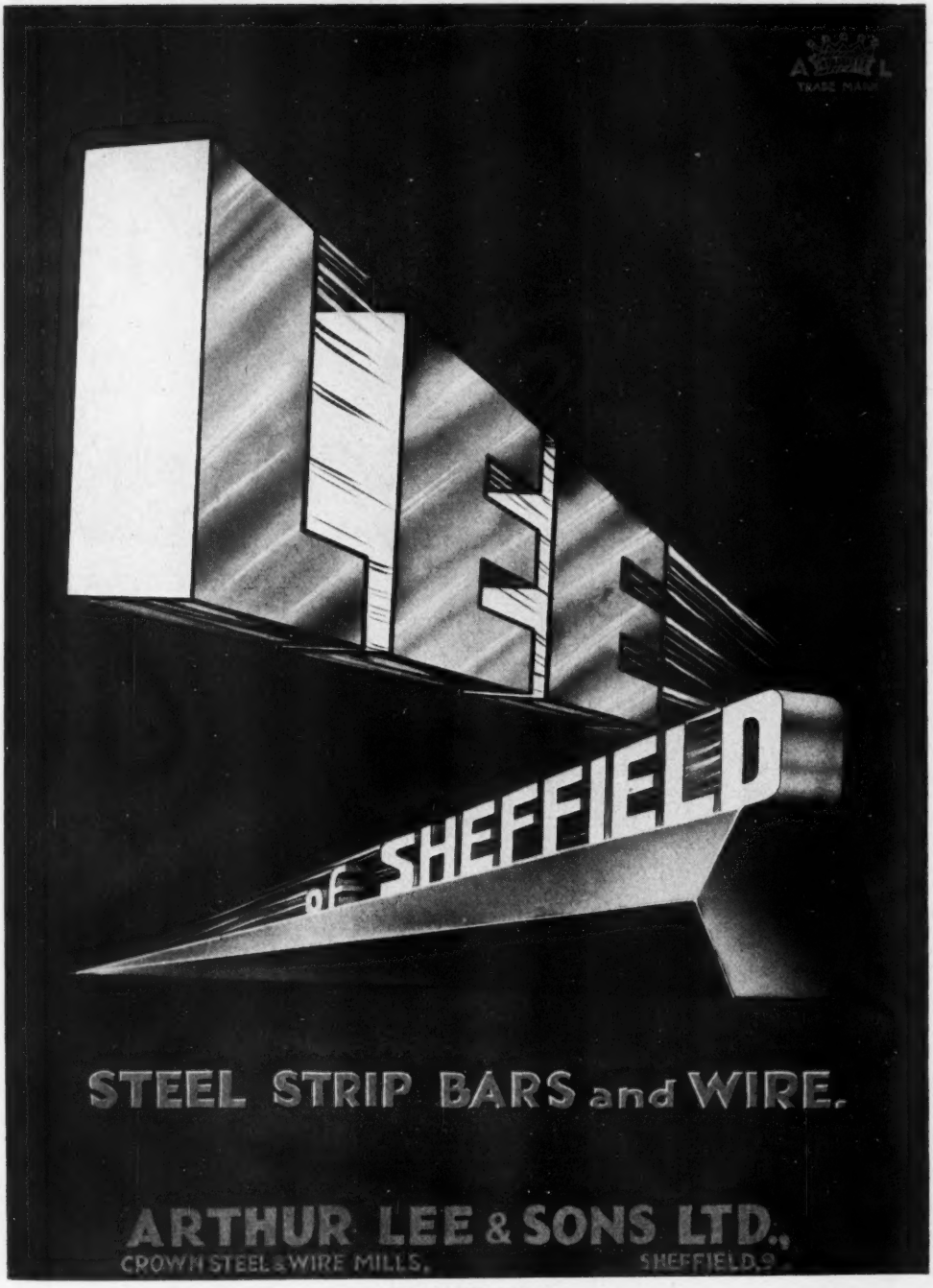

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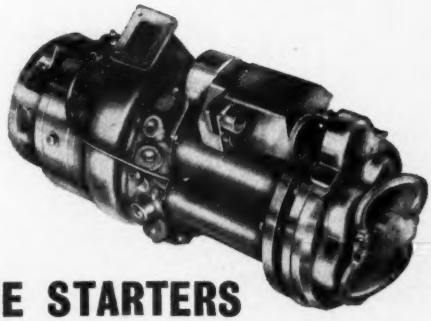

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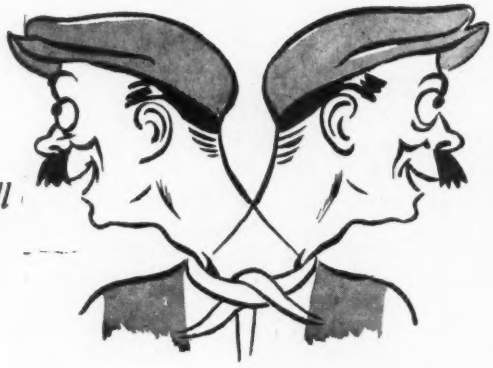

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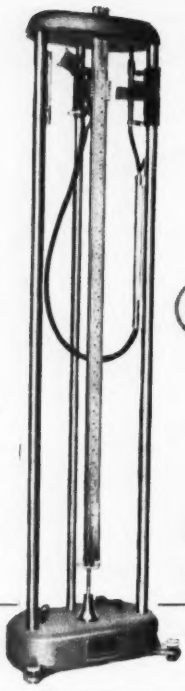

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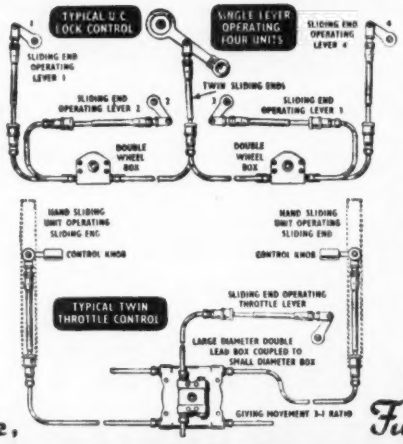
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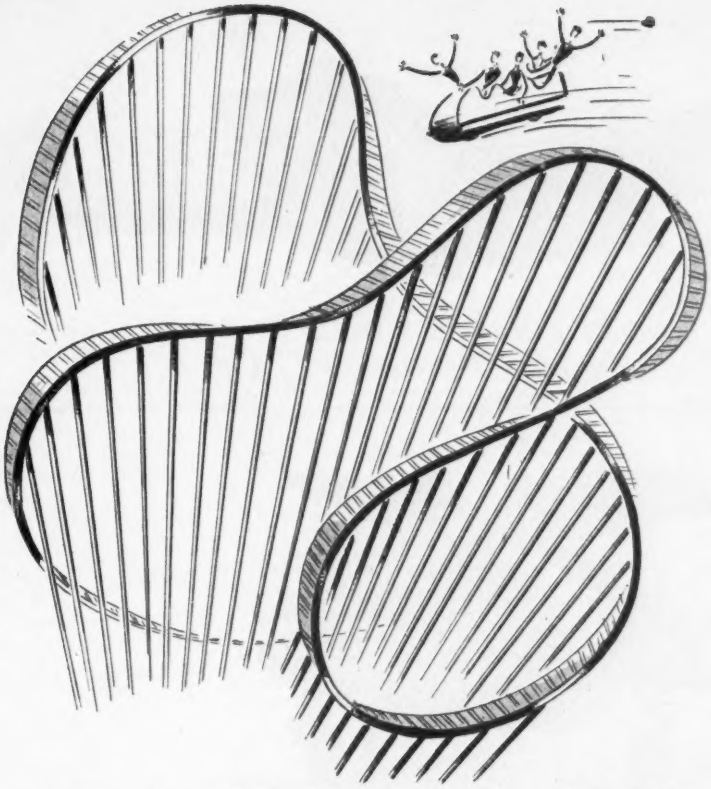

Switchbacks and Switches . . .

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Founded 1909

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Hayload v. Payload

OF all the proverbs and fables about innocent little additions that make disconcertingly big sums, the classic is the one about the camel and the last straw. Had that proverbial beast appeared in Stamford Street and collapsed at our feet, we could have been little more surprised than we were recently on seeing the aggregate, in simple units, of the individually small demands which accessory equipment imposes on the primary power source of the modern aircraft. These particular straws, we reflected, may not actually break backs, but they certainly threaten seriously to reduce both performance and payload.

It was Mr. F. M. Owner, in his lecture on *The Application of Power to Aircraft* (see page 711) who provided the revelation. Tabulating the demands of accessory-power systems, he estimated that an aircraft of 100 tons weight required no less than 1,150 h.p. to cover services including full anti-icing and undercarriage operation but excluding the galley and a small addition for brakes. If de-icing, as opposed to ice prevention, is considered sufficient, the total figure can be reduced considerably and cyclic de-icing permits reduction in the demands of the airscrew. A representative figure for a modern four-engined air-conditioned aircraft of 100,000 lb a.u.w. might be 250 h.p.

One item included above, but not generally budgeted for, is that of power for flying controls—intermittent, but required several times a minute during flight. The need for powered controls on the majority of new high-speed aircraft is generally accepted, and up to 25 h.p. may have to be written off under this heading.

Gas turbines—particularly of the Bristol type with free turbine—offer, it seems, better possibilities for tapping-off power, heat and pressure than do piston engines. It will be remembered that the Bristol company was, before the war, among the very first to adopt accessory gear boxes mounted away from a radial power unit. In American piston-engine practice it is still usual to hang the majority of accessories directly on the main unit. The pros and cons of auxiliary power units, particularly small gas turbines of low weight (though of high specific fuel-consumption) are discussed by Mr. Owner; duplication and weight are the chief penalties. One concludes that, while keeping an eye on their development, he does not yet favour their adoption.

For the time being, then, the gas turbine will probably have to carry increasing numbers of straws on its back—and thus add a note of interrogation to the popular phrase "free as air". In fact, the pound of air required per person per minute in air-conditioned flight may alone represent less than 1 per cent of the gas turbine's mass flow; and assuming that pollution, such as by oil fumes, can be avoided (this is no simple matter, and rules out the use of methanol injection) the tapping-off of 1 per cent of compressor air means a penalty, according to Mr. Owner, of 1½ per cent in power output and 2½ per cent in specific consumption.

Emergency Service

PURSUING its energetic campaign in support of the country's air defences, the Air League of the British Empire has issued a Memorandum on "An Air Wing for Civil Defence." The main purpose of such a unit would be to maintain communications should severe bombing—possibly atom bombing—destroy all surface communications. Natural disasters in many parts of the world have already indicated the valuable work to be done by light aircraft in similar circumstances.

The sort of emergency for which the League seeks to prepare is such that accepted standards of aircraft operation would be set aside. The pilots would be gathered from ex-R.A.F. men who had passed the age limits for recall, and there would have to be a good deal of improvisation at bases and for servicing. Aid from the Services would of necessity be small, now or in wartime, because of their own many commitments.

Simple, cheap and rugged light aircraft of the Auster type are almost certainly the sort for the job. We do not believe that ultra-lights of the kind mentioned in the Memorandum could do the work, even in fine weather. To be effective in emergency, a civil air wing of the type proposed should certainly be organized and exercised in peacetime.

LABRADOR'S IRON-ORE AIRLIFT

An Ambitious Engineering Project in which Air Transport is Playing a Key Part

By FRANK ILLINGWORTH

Typical country over which the railway from Seven Islands to Burnt Creek will pass.

ONE of the biggest undertakings in the history of civil aviation is getting into its full stride in Labrador, where rather more than 200 million dollars (£71½ million) is now being spent in the development of what is described as "the largest iron-ore fields in the world." Labelled the Ungava Project, the venture will depend for its success primarily on the work of air freighters.

Between May and October this year between four and five million pounds of heavy equipment are being put down on the newly constructed airstrips in the heart of "The Barrens." This entails a day and night shuttle service of thirteen aircraft, ranging from a C-119 Fairchild Packet (loaned by the U.S.A.F.) to a Stinson, apart from the DC-3s and DC-4s operated by Canadian Pacific Airlines between Mont Joli (on the south bank of the St. Lawrence River) and the airstrip at the focal point in the Ungava Project, the log-cabin settlement of Burnt Creek.

The plan to broach the immense resources of the Labrador iron-ore fields is bold in the extreme from an engineering point of view. It also illustrates the part aviation can play in the industrial development of a country; and the Ungava Project will undoubtedly become the blueprint for similar industrial schemes of the future.

The project was born shortly after the war, when the Hollinger Mining and Exploration Company was formed with a backing of Canadian and United States dollars to tap the fabulous wealth in the little-known interior of the Barrens south-east of the Hudson Bay. The country here is wild in the extreme. The pilot with whom I flew to Burnt Creek, ex-R.A.F. Don Taylor, pointed down at the high plateau: "You wouldn't stand a dog's chance if you force-landed there!" Almost bare of vegetation, the plateau supports a handful of Indians whose life is a constant battle against starvation and exposure.

Servicing a Bell helicopter for a flight to the interior of Labrador.

It is planned to transform the little French-Canadian fishing village of Seven Islands into a port capable of handling twenty million tons of ore annually, and to drive a railway 360 miles northwards into the locality now known as Burnt Creek, in the heart of the ore deposits. Engineers to whom I spoke said: "The railway job entails several major engineering problems. But they'd be a good bit more pronounced if it wasn't for our airlift. In fact, the airlift is making it possible to accomplish in three years what would normally have taken us at least twice as long."

The Ungava Project opened with the drone of Norseman floatplanes. Landing on a small lake near Burnt Creek, they put ashore teams of geologists, and before the summer of 1947 was out some two dozen survey teams were "in the field," some engaged in the geological work, others in plotting the route for the railway linking Seven Islands and Burnt Creek.

An airstrip was laid at Burnt Creek. The Canadian Department for Transport extended the airfield at Seven Isles, and two intermediate strips were laid at points along the railway route, at localities known as Mile 36 and Wacouna, construction equipment being landed there.

"We built the Wacouna strip in ten days last October," William Frazer, traffic manager at Seven Islands Airport, told me. He added: "The weather was lousy almost the whole time. You know—Labrador weather, interminable fog and blizzard. But then we had to get weaving because some of the heavy railway-building equipment arrived at Seven Islands ahead of contract."

And with the completion of the strip at Wacouna 2,400,000 lb of heavy gear was landed there from Seven Isles—tractors, trucks, road graders, jeeps, scrapers, compressors, fuel, food, timber for the necessary construction camp, and labour gangs. Three thousand cases of dynamite were flown in in thirty-six hours. The constant aim was to keep the aircraft flying, to bring in the equipment; engineering workshops were built at Wacouna so that the vehicles and other heavy gear cut into sections with blowlamps (to facilitate loading into the DC-3s) could be welded together again.

The airstrip at Mile 36 is situated on the floor of a canyon, with black walls towering up many hundred feet. It is hardly an ideal site for approach and take-off, but light aircraft, at any rate, put down there in most sorts of weather.

The strips here and at Wacoua were used during the winter only for the delivery of urgently required equipment or to "take out" sick men. But last May, before the snow had gone, when the lakes were still frozen and the weather unreliable, the transports began to arrive one after another; and at least 1,000 tons of gear will be landed at Wacouna alone before winter closes in again.

Norseman floatplanes leave from Knob Lake (Burnt Creek). There are 26 constructional camps in the Ungava region, most of which are served by air.

Up to 1947 Norsemans were used exclusively: they proved ideal for work among the maze of small lakes that dot the Labrador Plateau. Subsequently a Bell helicopter came into service, and it proved indispensable for supplying the field parties of geologists and railway surveyors. But with the construction of airstrips it was possible to step up the tempo.

"With four landing strips along the railroad route we can build the line northwards from Seven Islands, southwards from Burnt Creek, and north and south from Wacouna and Mile 36," I was told. "You can appreciate the saving of time this means: we can work from four bases, landing even the heaviest gear right on the job."

During my first night at Burnt Creek in May, two 3½ cu yd shovels were flown in (dismantled), together with one ton of assorted steel lengths, 3000 lb. of bedding and bed-frames, and several tons of mining and excavating equipment. The aircraft in which I flew from Mont Joli (opposite Seven Islands on the south side of the St. Lawrence) carried a load of timber, a canoe, two prospectors and a Chinese cook, a Welshman wearing a red check shirt, a spaniel in a crate, two fishing rods (trout in the Burnt Creek streams weigh up to 25 lb), half a ton of foodstuffs, and four boxes of dynamite.

Freightage costs have been brought down considerably since the first airstrip was built. In the early days, freight costs from Mont Joli to Burnt Creek stood at 73 cents per pound; today the figure is 10 c, and by October it will have dropped to 8 c. And freight costs to Wacouna have dropped from 50 c to 5 c.

The DC-3s each carry a payload of 8,350 lb (provided individual loads are not too bulky) and, undoubtedly, overall costs will drop now that the Hollinger airfleet has been increased by a Fairchild Packet, for the arrival of this big freighter at Seven Islands means that it is no longer necessary to dismantle the bulkier equipment. No time was lost in loading the Fairchild. Within hours of its touching down at Seven Isles on May 27th bulldozers and trucks were being trundled aboard for delivery to Burnt Creek.

Alec Cheesman, in charge of the airfield at Burnt Creek, was formerly a member of one of Admiral Byrd's Antarctic expeditions, and has had twenty years of bush piloting in the North. He said to me: "Within three years the three dozen log cabins here will have grown into a sizeable mining town. We feel we're doing big things. Trouble is, there's no time for sleep during the summer: aircraft coming in day and night. But no grumbles, please. But for the airlift, Operation Ungava would be pretty well impossible."

And air-freighting will not cease when, in 1954, the railway reaches Burnt Creek. For within a few years of the first ore-train pulling out for Seven Islands, today's log cabin settlement of 700 men (24 in winter) will have a population approaching 10,000—a town worthy of a daily air service by the DC-3s and DC-4s of Canadian Pacific Airlines, who at the moment operate a monthly Mont Joli to Burnt Creek service. Meanwhile, Norsemans and helicopters will continue to land geological field parties farther in the interior of the Labrador Barrens in search of more mineral wealth.

The River Moisie, along the banks of which engineers are driving the railway towards Burnt Creek.

Unloading a jeep from one of the Canadian Pacific DC-3s operating in the Northlands.

NAVY DAY AT BRAMCOTE

H.M.S. "Gamecock" Celebrates the King's Birthday

FOR the ceremonial review and march-past in honour of the official birthday of H.M. the King, the weather at R.N.A. Station, Bramcote, on June 9th was kind, for a light veiling of cirro-stratus only slightly diminished the welcome sunlight. Later on, however, low cloud and rain drifted over the Warwickshire countryside, and the flying programme had to be somewhat curtailed.

The salute was taken by Vice-Admiral M. J. Mansergh, C.B., C.B.E., Fifth Sea Lord. Although the ship's company and guard of honour largely comprised trainee ratings, none of whom had been in the Navy for more than ten weeks, their smartness and general air of efficiency would have done credit to veteran A.B.s.

The first item in the flying programme was an exhibition of aerobatics by a Sea Vampire, and this was followed by a couple of Seafires demonstrating rocket-assisted take-off—a noisy and not unimpressive spectacle. As the Seafires landed, Lt. Cdr. Sproule, in an Olympia sailplane, was towed off behind a Tiger Moth and, as the combination gained height, four Seafires and three Harvards of 1833 R.N.V.R. Squadron (Bramcote) took off. When the last Harvard got airborne, Lt. Cdr. Sproule cut loose from his tug, and simultaneously fired smoke cartridges mounted on the sailplane's wing-tips. Thus, as he descended in a series of tight turns and loops, the smoke trails wove an intricate pattern in the sky.

As the Olympia landed—across wind—eight Sea Furies of 801 Squadron taxied out and formed up in rather open ranging to simulate free take-off from a carrier deck. By now, the weather had deteriorated considerably, but even so, the Sea Furies' simulated deck landings were not as good as they might have been. The third man's approach was far too high and he was given a wave-off, whilst the fourth man landed so short that, had the field been in fact a carrier deck, he would have gone into the sea well astern. These shortcomings were compensated, however, by the last man, who gave a most polished display of aerobatics, all the more so for being carried out at moderate speed.

The Seafires and Harvards then came in—in very open formation—to attack the "fortress" in the centre of the field which, despite the rabble nature of the attack was, however, spectacularly set aflame through the good offices of "old man amp."

A captive balloon was then towed out to the centre of the field and from its basket men of the 18th (Warwick) Battalion the Parachute Regiment, T.A., descended by parachute. Three "sticks," each of five men, showed that a parachute is a very convenient means of descending from 700ft in 30 seconds. As the balloon was winched down, a Sea Otter flew across in front of the crowd at about 30ft with its wheels down, then flew back equally low with wheels up and with men standing up through the forward and after hatches, the man in the latter station trying, somewhat ineffectually, to semaphore in the slipstream.

The display was concluded with some formation aerobatics by three Sea Vampires from 702 Squadron, but as the weather had now worsened a good deal, their manœuvres were confined to beautifully executed slow barrel rolls in tight line-astern and vic formations. Even so, at the top of the rolls, i.e., at about 600ft, the aircraft were in the decaying cloud-wrack; a very nice performance indeed.

SWANSEA DEFIES THE ELEMENTS

IT is not often that an air display can be virtually crippled by bad weather and yet remain an outstanding success, but this was in fact the case at Fairwood Common last Saturday. Under a gloomy sky and in a biting wind the organizers (Swansea Flying Club and the Swansea Corporation) pressed on gamely to provide a programme quite as entertaining as any we have witnessed this year. Under these conditions the general public could hardly have been expected to turn up in force but, although the show involved a considerable financial loss, there was certainly no lack of enthusiasm among the pilots taking part, and those spectators who braved the weather got more than their money's worth.

The programme also featured a new event in the racing calendar, the Welsh Air Derby—a three-lap race under Royal Aero Club rules over a 25-mile circuit.

By three o'clock conditions were deemed flyable and the programme opened with a fly-past by three visiting aircraft (among them was *Flight's* Gemini), carrying the Mayor and members of the organizing committee.

The Under-Secretary of State for Air, Mr. Aidan Crawley, M.B.E., arrived in a D.H. Devon and, in a short address during the programme, stressed Britain's urgent need for large numbers of suitable young men to train as R.A.F. aircrew.

Despite the spreading low cumulus, aerobatics by a Meteor (F/L. Latham up) were impressive. He was followed by those inevitable gasp-raisers, the Patrouille d'Etampes, who provided their usual brilliant *pièce* in very gusty conditions. By this time an Auster, flown by Ben Gunn, the cheery Boulton and Paul test pilot, had managed to "find itself" above the cloud and duly released an Eon Olympia containing David Ince of the Midland Gliding Club, whose contribution included some tight loops and a very precise landing.

S/L. E. H. McHardy, D.S.O., D.F.C., commanding Wales' own fighter squadron, No. 614 (County of Glamorgan) R.Aux.A.F., gave a fine showing of assorted evolutions in a Vampire. A Sunderland and a Sea Otter from Pembroke Dock added to the variety of the proceedings with several low runs across the airfield.

Although it is not our usual practice to use "sensational" phraseology, we might be excused for doing so in describing the next event on Swansea's programme. Prince Cantacuzene, who before the last war was well known as a Rumanian aerobatic and contest pilot, had flown a recently-acquired Bücker Jungmeister from Madrid in order to give one of the first displays of a renewed career as a professional exhibition pilot. His performance literally has to be seen to be believed and, judging by his form last Saturday, his act will undoubtedly prove to be one of the most sought-after items at future British displays. The hearts of experienced pilots skipped many a beat as "Buzz" Cantacuzene, as he prefers to be known, performed a series of manoeuvres which included a "one-and-half" flick roll at nought feet, culminating in an inverted climb to complete the loop. There was also some amazingly low flying which, we understand, might have been even lower had the wind conditions been favourable. His spine-chilling performance concluded with a three-point landing made off another flick roll at about 20ft. It is to be hoped that we shall see much more of this brilliant pilot in forthcoming displays.

Nine competitors in the Welsh Air Derby then left at their handicap intervals to complete three laps of a 25-mile course. Following a lively struggle, pride of place eventually went to H. ("Timber") Wood, Blackburn and General Aircraft chief test pilot, flying a Proctor I at an average speed of 155½ m.p.h.—a creditable figure for three laps, each with six turns, over hilly country. Second was Ian Forbes' Nighthawk, followed by the redoubtable Fred Dunkerley's well-known Gemini. A handsome silver trophy and a cheque for £125 constituted the spoils for the winner, while cash prizes of £75, £50 and £25 were also given to those gaining a place—the last-named sum to the fourth man home, D. C. Jemmett in a Miles Hawk.

The resources of the Auster stable were called upon to provide the last two events—a polished display of Ranald Porteus' specialized tricks in the lively new Aiglet trainer and crop-spraying by Aerial Spraying Contractors, Ltd., of Boston.

SEEING WHAT FATHER MADE

FIFTY special buses and 100 coaches last Sunday carried employees of the English Electric Co., Ltd., from Preston to the firm's airfield at Warton, to see a demonstration of one of the Canberras they had helped to build. Altogether, a crowd of 15,000, composed of workers, relatives and friends, arrived; they were welcomed by Mr. F. W. Page (chief engineer, aircraft division) and Mr. D. L. Ellis (deputy chief engineer), and were later treated to a characteristically brilliant display of flying by W/C. Roland Beamont, chief test pilot.

English Electric are also building Vampires, and one of these was demonstrated, to the delight of the crowd, by test pilot Johnny Squier.

Thousands were able to inspect the Canberra at close quarters, and to see the big wind tunnel and other works equipment.

Representatives of the Glenn Martin Co. (which is to build the Canberra in America) also watched the display.

FROM ALL QUARTERS

Soviet Flying in Germany

FOR two months past great activity has been observed among Soviet squadrons based in Germany, especially, it is reported, within the triangle Jüterbog-Forst-Dresden. Numerous crashes were witnessed: the inhabitants of Luckau, for instance, are said to have seen as many as six in a day, and similar reports have come from airfields in Brandenburg and Mecklenburg.

A correspondent suggests that the Russian Air Force needs pilots not only for its own units, but also to build up a *Volkspolizei-Luftwaffe*. It is a well-known fact, he maintains, that former German staff officers (he names only Col. Lehwess-Litzmann, who took part in the raid on Vienna in 1938 under General Wolf) have already returned from Russia. He goes on to observe that it is curious that, on the one hand, German pilots are learning to fly in the Russian manner, and, on the other, that Russian pilots should be learning German air discipline under German instructors in Russia.

He further reports that for the training of crews operating the new-type Russian twin-jet bomber (see *Flight*, May 25th) old North American Mitchells are being utilized. Formerly, he reports, pilots went direct from the B-25 to the jet bomber, but within the last few weeks a new version of the bomber, adapted as a trainer, has come into service. In contrast to the front-line version, it has no armament or radar, and no glazing in the nose.

Exercises in Germany have accentuated tactical support for the army. The following types have been observed: Mig-15 jet fighter, La-9 and La-11 fighter/bombers, Il-10 ground-attack aircraft, twin-jet bomber (designation uncertain), Tu-2 and Pe-3 reconnaissance aircraft, Yak-11 communication aircraft, and Po-2 and Mitchell trainers.

"Civil Air Wing" Proposed

THE Air League of the British Empire issued a Memorandum last Tuesday, June 12th, urging the early formation of an air wing as an essential adjunct to the civil-defence organization of the country. It points out that civil defence goes far beyond the question of dealing with damage and casualties after an air attack, a vital consideration being the maintenance, so far as possible, of normal life and industrial productivity. For civil defence and A.R.P. alone, a first necessity is the maintenance of communications, and an essential preliminary to the deployment of civil defence reinforcements is reconnaissance. Since it must be expected that surface communications will have been totally destroyed, the air may offer the only means of communication.

Briefly, the proposal is that an air wing shall be formed without delay chiefly from ex-Service pilots who have passed the upper age limits for recall, and that the aircraft shall be of some light type as used in flying clubs, or possibly an ultra-light built for the purpose. Proposals are made that operation should be in conjunction with existing flying clubs or reserve centres, or "even a well-equipped garage adjacent to a suitable open space", all being situated close to a Regional Civil Defence Headquarters. Resuscitation of the framework of the A.T.A. is suggested as a rapid and effective method of creating the required organization.

COMMEMORATIVE: Sir George Nelson, chairman of English Electric, presents a silver replica of the "transatlantic" Canberra to A. Cdre. A. W. B. MacDonald for the officers' mess at Boscombe Down. A view of the model, and a note on the presentation, appear on p. 717.

FARMERS' FRIEND: The advantages of using helicopters for pest-control duties were convincingly demonstrated near Salisbury last week, when a Hiller 360, operated by Pest Control, Ltd., of Bourne, Cambridge, sprayed phenoxyelene weed-killer over a 90-acre farm in one afternoon.

Lord Tedder, Cambridge Chancellor

WHEN Marshal of the Royal Air Force Lord Tedder was installed as Chancellor of Cambridge University on June 7th he was, as is the custom, welcomed in a speech in Latin. It was delivered by the Deputy Orator, Mr. L. P. Wilkinson, and a translation would read:

"Perhaps someone may ask: 'What has the profession of arms to do with the University?' What has Mars to do with Apollo, with the Muses? Certain it is that we chose you with the more enthusiasm because we had assured ourselves that there were arts other than the military for which you cared. For you have always been a loyal son of your college of St. Mary Magdelene from of old, when among your contemporaries you were a historian who was also an oarsman, down to your recent election to an Honorary Fellowship, while lately, at the invitation of Trinity College, you gave a successful course of lectures.

"That you have also in you the creative spirit of a painter and a desire to perpetuate what you find beautiful, you yourself avowed in your graceful broadcast talk on 'Personal Pleasures'.

"Wherefor we rejoice to have with us such a man as Chancellor —a faithful son of his *Alma Mater*, a promoter of harmony and friendship, a lover of beauty and the arts. Though covered with martial glory he is no 'vainglorious soldier,' but one who puts humanity before war."

Some pertinent observations on world affairs were made by Lord Tedder in his own speech. We quote one example: "True leadership is the product of good team-work; the 'leader' is the last resort of the herd."

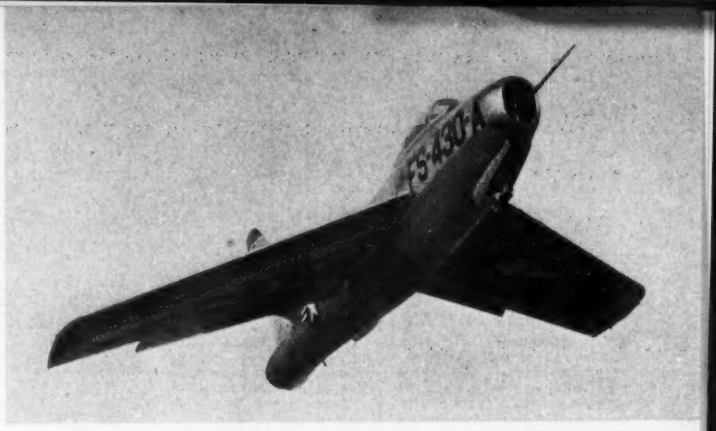
More About the Skeeter

THE latest specification on the Cierva W.14 Skeeter two-seat (side-by-side) helicopter, now under development by Saunders-Roe, Ltd., quotes the maximum disposable load as 550 lb and the all-up weight as 2,000 lb. These figures relate to the version with Blackburn Bombardier 180 h.p. engine. Suggested applications of the Skeeter include pilot-training, private flying, photography, military observation and gunnery spotting, naval ship-to-ship and ship-to-shore duties, fleet spotting and miscellaneous radar duties, including calibration. The forward cabin section is of light-alloy sheet construction, with Perspex windows affording a wide field of vision in all directions, including directly rearwards. Behind this a section of welded steel tubular construction carries the engine and transmission gearboxes as well as the vertical rotor-drive shaft. Being flexibly mounted athwartships the engine is readily accessible, as is the transmission.

Dimensions are: main rotor diameter, 32ft; tail rotor diameter, 5ft 8in; length, 31ft 2in; length (without blades), 28ft 5in; height over tail rotor, 9ft 10in.

The figures hereafter refer to the Skeeter powered by a D.H. Gipsy Major of 150 h.p., and are given only as an indication of the performance to be expected with the more powerful Bombardier: Speed at max. continuous power at s.l., 94 m.p.h.; speed at max. weak mixture power at s.l., 80 m.p.h.; max. range (25 gall fuel), 295 miles; max. endurance (25 gall fuel), 5.38 hr; take-off ceiling (hovering inside ground cushion, max. rating), 9,200ft; ceiling (max. altitude for level flight, max. rating),17,300ft.

HERE AND THERE



SAPPHIRE-THUNDERJET: The Republic F-84F Thunderjet fighter, powered with the Armstrong Siddeley Sapphire turbojet. The Sapphire is to be manufactured in America by Curtiss-Wright and General Motors. The Thunderjet's nose air-intake duct has been redesigned and the fuselage increased in depth by about 7in to accommodate it.

Display in Sweden—

SAAB J-29s, Vampires and gliders were among the 400 aircraft which flew over Stockholm on June 3rd to mark the 25th anniversary of the Swedish Air Force.

—and Italy

TWENTY-SEVEN British-built Vampires participated in a flying display over Rome on June 3rd. Other types represented were Helldivers, Lightnings, Thunderbolts and Mustangs, bringing the total to about 200 aircraft. Incidentally, the name Vampiria has been given to a village built for the families of personnel attached to the jet flying school at Amendola, near Foggia.

Two at Home

AMONG events in Britain this week-end are two air displays: the Boston Aero Club is holding its Festival Rally and Display at Wyberton, Boston, Lincs, on Saturday, and a display in which all three Services and the U.S.A.F. will participate is to be held at Clifton Airfield, York, on the same day. On Sunday, at York, there will be events of particular interest to club members and private owners.

New Decca Chain

ABOARD the M.V. *Royal Iris* off Liverpool on June 7th the new North-West British chain of the Decca Navigator System was formally declared open by Air Chief Marshal Sir Frederick Bowhill, master of the Honourable Company of Master Mariners. With the added coverage given by the new chain, an area of over a million square miles of N-W. Europe is served by Decca.

Canadian Construction

JET trainers will soon be built in Canada, according to a statement by A. V-M. D. M. Smith, R.C.A.F. The Vampire, Venom and Lockheed T-33 are being considered. The Air Vice-Marshal also announced that Canada would soon be producing engines for Harvards, adding that she would become the world's only source of complete Harvard units, and would make Harvards for all North America's needs. He also revealed that Canada is looking for replacements for the Lancasters now being used for shipping patrols. A "medium between the Lancaster and the Lockheed Neptune" is sought.

Light Twins in the States

IT is reported by *Aviation Week* that nine pre-production Beech Twin Bonanzas are being built in addition to the two prototypes now flying; then will start the first production run of a hundred—this in addition to military sales. Simultaneously comes news that de Havilland's Dove-sales campaign in the U.S.A. has been so successful that the company has had to stop appointing new distributors. "The company's big campaign," states our contemporary, "is to line up enough Dove service bases to take care of the plane in any part of the country."

Prince Baudouin at Gosselies

WHEN he visited the Avions Fairey factory at Gosselies, Belgium, recently, H.R.H. Prince Baudouin of Belgium saw the new workshops of over 60,000 sq ft area, built to expedite production of Meteor 8s. The Prince was accompanied by his A.D.C., Lt. Gen. L. Leboutte, D.F.C., Chief of Staff of the Belgian Air Force. He was received by Mr. E. O. Tips, managing director of Avions Fairey, before inspecting the Meteor assembly shops and the repair and overhaul workshops for Spitfires, Meteors and Harvards. His Royal Highness examined various Avions Fairey products, including the Belfair, present holder of the international distance record for aircraft weighing not more than 500 kg.

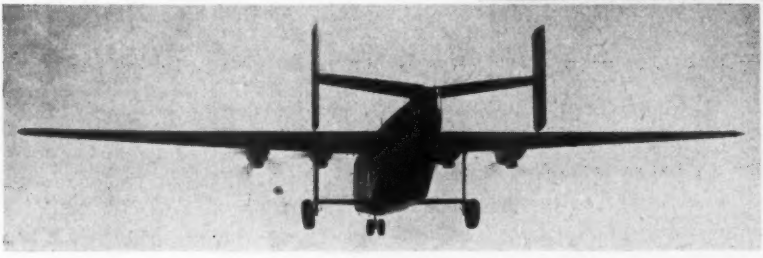
PRINCE BAUDOUIN inspects the Belfair (see paragraph above)

Standards on Show

A GAS TURBINE, annotated to show the use of materials standards in modern engine practice, will be a feature of the Standards Exhibition organized by the B.S.I. and to be held at the Science Museum, South Kensington, from June 18th to 28th. Another aeronautical exhibit will be a control column in the manufacture of which over 20 British standards are involved.

S.R./A1 Comes to Town

THE Saunders-Roe S.R./A1 fighter flying-boat, which, as we have already reported, is to be moored off the South Bank Exhibition site during British Gas Turbine Week (June 18th to 23rd), is to alight on the Thames, in Woolwich Reach, at about 5.30 a.m. next Sunday, June 17th. Later



THE BIG BACK DOOR: The prototype Blackburn and General Aircraft G.A.L.60 military transport (four Bristol Hercules) has recently been flying from Brough with the rear doors and loading ramp removed for supply-dropping experiments. The G.A.L.60 is the first British Aircraft designed specifically for the dropping of bulky internally stowed loads, including military vehicles.

Rotol at Paris
ROTOL
PROPELLERS AND AIRCRAFT EQUIPMENT
ARE EXHIBITED ON THE ROTOL STAND
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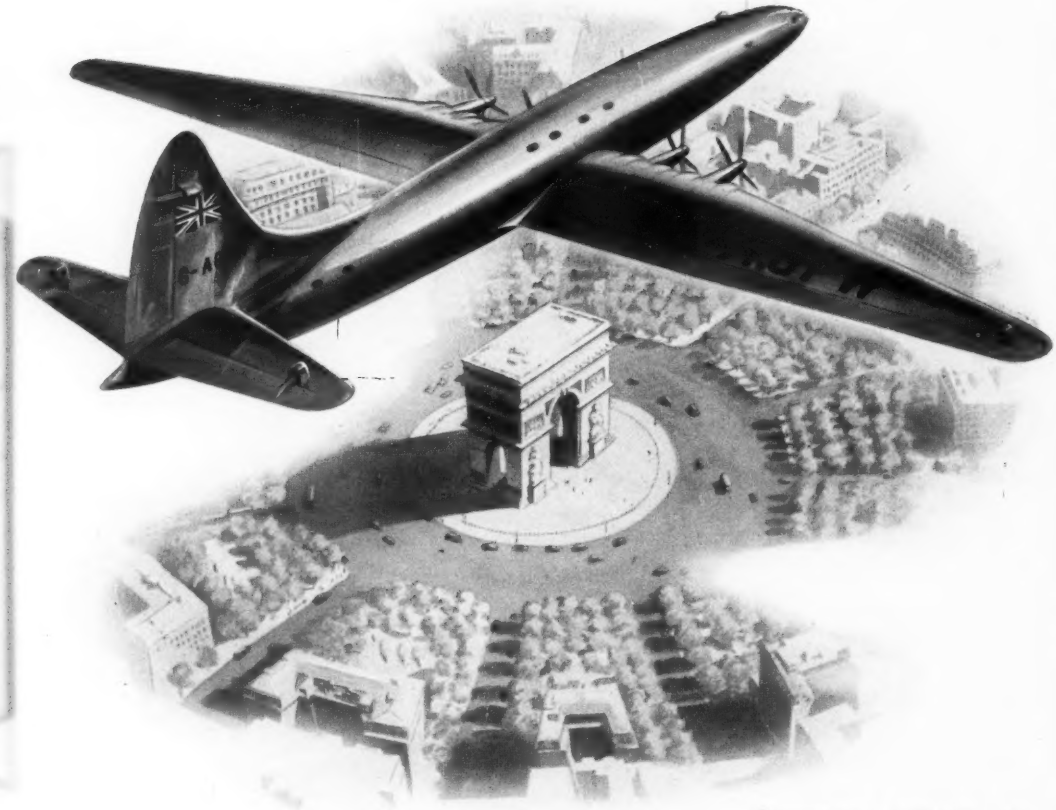
THE XIXTH

INTERNATIONAL AIR EXHIBITION—PARIS



Circumstances permitting, the "Bristol" Brabazon I Mark I will fly over the Salon during the Flying Display.

"Bristol"

STANDS 30 AND 40 — GRAND NEF

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HERE AND THERE...

it will be towed up-river to its mooring. The uncomfortably early hour of arrival is dictated by the necessity of landing at low tide in order to avoid traffic and also the floating driftwood that frequently covers the surface at high tide.

Cayley Exhibition

THE Scarborough aeronautical exhibition, to be opened on June 30th by Lord Brabazon, will centre on the pioneer work of Sir George Cayley, who was born in the borough in 1773. The R.Ae.S. and Blackburn and General Aircraft, Ltd., are assisting in the organization.

Golfers—

THERE is opposition to the projected new factory at Chicago, in which the Buick division of General Motors is to build the Armstrong Siddeley Sapphire under licence. It comes from an adjoining golf club, whose members fear that the noise from the test-beds will put them off their game!

—go to War

BY an odd coincidence, a news-story from Union City, Tennessee, tells of a golfer who, playing on the local links, made a long, high drive from the third tee. The ball passed through the fuselage of a low-flying Piper Cub, with such an impact that the pilot immediately landed on the course in order to inspect the damage.

—but are Observed

COINCIDENCE No. 3, to cap these golfing stories, comes in a report from Washington that the U.S.A.F. now has a camera that, in a recent test at 45,000 ft., secured a picture of a golf course on which —with the aid of a magnifying glass—an object lying on a green could be identified as a ball!

Hot News

EXCEPTIONALLY high-speed Press coverage of last week's T.T. motor cycle races in the Isle of Man was provided by *The Motor Cycle*. Photographs and stories of the events on the Monday were flown to Fair Oaks airfield, Surrey, by C. R. Hodgson in *Flight's* Gemini aircraft and rushed to London for overnight printing. The complete issue, containing a fully illustrated commentary, was on sale in the Island next day, less than 24 hours after the races. On the previous week-end, the same aircraft had been flown in the Goodyear Trophy Race at Wolverhampton by the Editor of *Flight*, W/C. M. A. Smith.

Battle of Britain Film

FIRST sequences of the Battle of Britain film *Hawks in the Sun* (original title *Angels One Five*) have been shot at R.A.F. Station, Kenley. Airmen, it is reported, have found themselves saluting actors in uniform—but have decided, nevertheless, to play safe.

Tale of a Bottle

A BOTTLE of whisky autographed by a Wellington crew which failed to return from a war-time mission recently realized £30 on being auctioned in London in aid of the R.A.F. Benevolent Fund. The purchaser, an Isle of Man businessman, has now sent the bottle to the pilot's mother in Australia.

ROTARY RAMJETS: Latest figures for the new ramjet-rotor Hiller Hornet show that it carries a useful load of 544 lb (empty weight, 356 lb) and, with rotor folded, can be stowed in a floor space of 13ft by 5ft. Each ramjet unit, developing 31 lb net thrust (34 h.p. equivalent), weighs 11 lb. C. Colin Cooper—seen here with Stanley Hiller is the nearest of the trio—of Helicopter Hire, Ltd. will handle the Hornet in this country.

IN BRIEF

FROM Avro Canada, Ltd., comes the announcement that Mr. Robert Douglas Armstrong has been appointed director of finance. He was formerly with Imperial Oil, Ltd.

* * *

In order to meet increasing home and export demands for their products, the Accurate Recording Instrument Co. have opened a 4,500 sq ft extension of their works at Garth Road, Morden, Surrey.

* * *

MR. G. E. PETTY, M.I.Mech.E., F.R.Ae.S., who is relinquishing his post of chief designer to Blackburn and General Aircraft, Ltd., in order to become their technical adviser. He has been with the firm for 35 years.

* * *

Mr. Brian D. Songhurst has been appointed to the board of Ingersoll (Mfg.), Ltd., and to two of their subsidiary companies; current production of these firms includes a number of highly intricate assemblies for aircraft and allied purposes. Mr. Songhurst is, of course, well known in the Industry as hon. secretary of the Aircraft Golfing Society.

* * *

B.E.A. Vikings figure briefly in a new colour film which, sponsored by H. J. Enthoven and Sons, Ltd., deals with the production and uses of their "Superspeed" activated-resin-cored solder. Though treated from the publicity rather than from the scientific angle, the film is informative, and copies (16 mm) may be hired by technical training schools, engineering societies, etc., on application to the company's secretary at Enthoven House, 89 Upper Thames Street, London E.C.4.

INTERNATIONAL INSPECTION: During a recent visit to the Saunders-Roe works at Cowes this representative party of foreign air attachés saw the Princesses under construction.

THE FESTIVAL AIR RACES

Whys and Wherefores of a Great Sporting Occasion

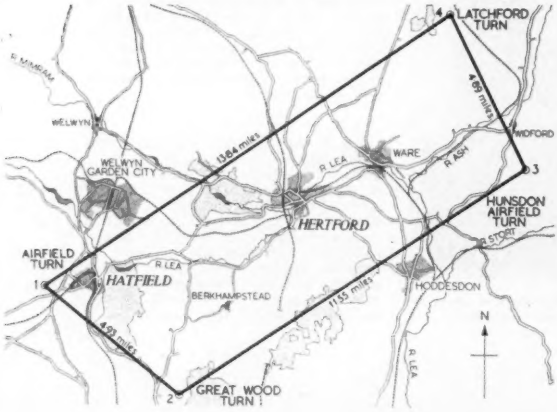
EXCELLENT sport is promised by the programme of the Festival of Britain 1951 National Air Races organized by the Royal Aero Club. The venue is Hatfield Aerodrome; the date, Saturday, June 23rd—a week hence. The races are for the King's Cup, Kemsley Challenge Trophy, Norton-Griffiths Challenge Trophy, Siddeley Challenge Trophy, Grosvenor Challenge Cup, Royal Aero Club Jubilee Trophy, S.B.A.C. Challenge Cup, Air League Challenge Cup and Cooper Trophy. The Grosvenor, Norton-Griffiths and Kemsley events will be flown concurrently with the King's Cup Race.

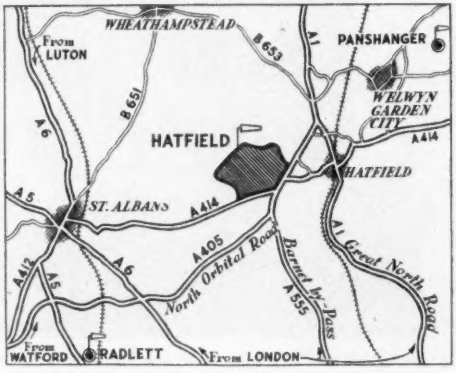
Britain's classic air race, that for the King's Cup, is a handicap event, for British subjects on British-built aircraft, over a cross-country course, and finishing round a closed circuit of 35 miles, a map of which appears on this page. On the cross-country course the contestants will fly from Hatfield to Southend, Cambridge and Luton, and back to Hatfield. The total distance is 169 miles. The "Grosvenor" is an international non-handicap speed race and the Aero Club Jubilee event—over three laps of a 35-mile quadrilateral course—is for machines with a minimum speed of 250 m.p.h. Advertised, not without justification, as "the fastest race in the world," the race for the S.B.A.C. Challenge Cup is an international scratch event exclusively for jet aircraft, whereas the Air League event is exclusively for high-speed piston-engined machines. These two last-named events will be flown concurrently with that for the Royal Aero Club Jubilee Trophy. The Siddeley Challenge Trophy Race will be flown over a distance of about 105 miles, made up of three laps of a 35-mile quadrilateral circuit (Hatfield, Great Wood, Hunsdon, Latchford, Hatfield). The Cooper Trophy race is a Royal Auxiliary

THE KING'S CUP RACE

No.	Entrant	Pilot	Aircraft	Engine(s)	Reg.
1	Dr. W. L. James	Entrant	Chilton D.W.1	Carden Ford	G-AESZ
2	W. R. Suffern	F/L. Hughes	D. H. Moth	D.H. Gipsy II	G-ABJJ
3	Capt. R. E. Gillman	Entrant	Avro Avian IVM	D.H. Gipsy II	G-ABEE
4	P. M. A. Hull	Entrant	D.H. Moth	D.H. Gipsy I	G-ABAG
5	G/C. G. F. K. Donaldson	Entrant	Taylorcraft Plus D	B'burn Cirrus Min. I	G-AHUG
8	Mrs. Y. M. Grace	Entrant	Taylorcraft Plus D	B'burn Cirrus Min. I	G-AHKO
10	D. G. S. Cotter	Entrant	Auster Autocrat	B'burn Cirrus Min. II	G-AGXT
12	P. Q. Reiss	Entrant	D.H. Hornet Moth	D.H. Gipsy Major I	G-ADND
14	R. W. Bates	Entrant	D.H. Hornet Moth	D.H. Gipsy Major I	G-AELO
15	R. S. Uffindell	J. Slade	Auster Autocrat	B'burn Cirrus Min. II	G-AJUR
26	A. N. Spriggs	S/L. N. Duke	Hawker Tomtit	A.S. Mongoose 3c	G-AFTA
27	T. W. Hayhow	Entrant	Auster Aiglet	D.H. Gipsy Major	G-AMIH
28	E. W. Westbrook	Entrant	Miles Messgr. IVa	D.H. Gipsy Major Id	G-ALBE
30	F/L. P. Raymond	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AKRW
31	Geoffrey Marler	Entrant	Miles Falcon Six	D.H. Gipsy Six If	G-ADTD
33	R. Matthews-Naper	Entrant	Miles Messgr. IIa	B'burn Cirrus Maj. III	EI-AFH
34	F. W. Seymour	C. Dawson	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AJZH
35	W. P. Bowles	Entrant	Miles Messgr. IIa	B'burn Cirrus Maj. III	G-AJYZ
36	Maj. W. L. Foster	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-ALGJ
38	R. Blackburn	P. G. Lawrence	Miles Messgr. I	B'burn Cirrus Bombdr.	G-ALAC
38	D. C. Jemmett	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major Ic	G-AKPE
41	A. N. Spriggs	G. F. Bullen	Miles Whitney Straight	D.H. Gipsy Major I	G-AEUJ
44	A. E. Coltman	Entrant	Miles Hawk Major	D.H. Gipsy Major I	G-ADMW
45	A. S. Butler	Entrant	D.H. Leopard Moth	D.H. Gipsy Major I	G-ACMN
46	F. E. N. St. Barbe	R. W. Jamieson	D.H. Leopard Moth	D.H. Gipsy Major 1/3	G-ACMA
47	J. Cooper	Entrant	D.H. Moth Minor	D.H. Gipsy Minor	G-AFNJ
48	Miss E. L. Curtis	Entrant	Wicko G.M.I.	D.H. Gipsy Major I	G-AFJB
49	R. H. Young	C. A. Nepean Bishop	Miles Hawk Tr. III	D.H. Gipsy Major If	G-AIUA
50	C. A. Pike	J. K. Brown	D.H. Moth Minor Coupé	D.H. Gipsy Minor	G-AFOJ
51	C. E. Lewis	A. L. Cole	Comper Swift	Pobjoy R	G-ABUS
52	K. M. Freeman	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AITO
54	T. R. Hilton	Entrant	D.H. Chipmunk	D.H. Gipsy Major 10/1	G-AKDN
55	D. F. Oglivy	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AKRT
56	Sir G. de Havilland	W. P. I. Fillingham	D.H. Chipmunk	D.H. Gipsy Major 10/2	G-ALWB
57	J. H. Ashton	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AKMN
58	W. T. Franklin	Entrant	Miles Gemini Ia	2 B'burn Cirrus Min. II	G-AKHV
59	Martin Sharp	Entrant	D.H. Chipmunk	D.H. Gipsy Major 10/1	G-AJVD
60	G. Geoffrey Smith	W/C. M. A. Smith	Miles Gemini Ia	2 B'burn Cirrus Min. II	G-AFLT
63	J. T. Basnett	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AIUE
64	G/C. N. A. Purvis	Entrant	Percival Proctor	D.H. Gipsy Queen II	G-AGTC
66	Dr. D. F. Little	Entrant	Percival Vega Gull	D.H. Gipsy Six II	G-AFEA
68	E. Day	Entrant	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AKRV
69	Miss M. Wigram	C. J. de Vere	Miles Hawk Tr. III	D.H. Gipsy Major If	G-AIBR
70	H. Bemberg	J. H. Sauvage	Percival Proctor I	D.H. Gipsy Queen II	G-AHES
71	R. Blackburn	H. Wood	Percival Proctor I	D.H. Gipsy Queen II	G-AHVG
72	W. J. Twitchell	Entrant	Percival Proctor V	D.H. Gipsy Queen II	G-AIAG
74	K. C. Millican	Entrant	Percival Proctor III	D.H. Gipsy Queen II	G-ALMS
75	V. Van Damm	Mrs. Z. Irwin	Percival Proctor V	D.H. Gipsy Queen II	G-AIET
76	D. J. Bennett	Entrant	Percival Proctor V	D.H. Gipsy Queen II	G-AHGR
79	J. E. Rylands	W. I. Lashbrook	Percival Proctor III	D.H. Gipsy Queen II	G-ALCK
81	D. J. Bennett	H.R.H. Prince Alexander of Yugoslavia	Percival Proctor III	D.H. Gipsy Queen II	G-AMCO
82	J. G. Crammond	Entrant	Hendy Heck IIc	D.H. Gipsy Queen III	G-AEGI
84	K. Millard	A.Cdre. J. Oliver	Miles Mercury VI	B'burn Cirrus Maj. III	G-AHAA
88	G/C. the Hon. Max Aitken	Entrant	Miles Gemini III	2 D.H. Gipsy Major 10/1	G-AITG
90	J. N. Somers	Entrant	Miles Gemini III	2 D.H. Gipsy Major Ic	G-AKDC
91	H.R.H. Princess Margaret	G/C. P. Townsend	Hawker Hart	R-R. Kestrel 3	G-ABMR
94	F. Dunkerley	Entrant	Miles Gemini Ia	2 B'burn Cirrus Min. II	G-AKKB
95	S/L. J. Rush	Entrant	Miles Falcon Six	D.H. Gipsy Six I	G-AECC
96	R. R. Paine	Entrant	Miles Hawk Speed Six	D.H. Gipsy Six If	G-ADGP
97	H. E. Scrope	Entrant	Percival Mew Gull	D.H. Gipsy Six II	G-AEXF

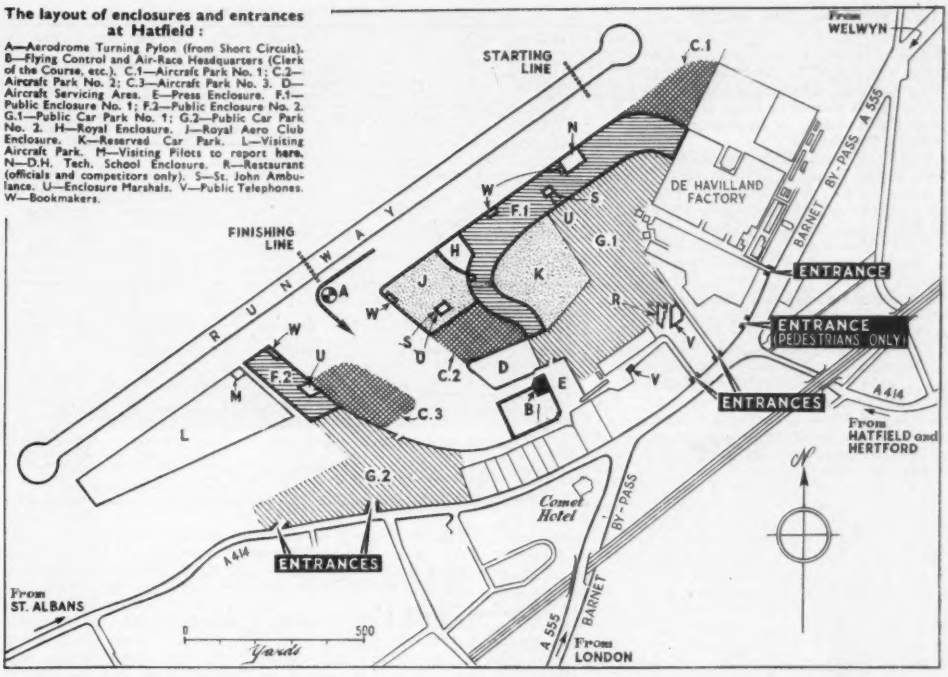
(Below) The 35-mile circuit which completes the 169-mile cross-country course for the King's Cup, Kemsley, Norton-Griffiths and Grosvenor Cup races. (Right) The approaches to Hatfield.





The layout of enclosures and entrances at Hatfield :

A—Aerodrome Turning Pylon (from Short Circuit). B—Flying Control and Air-Race Headquarters (Clerk of the Course, etc.). C.1—Aircraft Park No. 1; C.2—Aircraft Park No. 2; C.3—Aircraft Park No. 3. D—Aircraft Servicing Area. E—Press Enclosure. F.1—Public Enclosure No. 1; F.2—Public Enclosure No. 2. G.1—Public Car Park No. 1; G.2—Public Car Park No. 2. H—Royal Enclosure. J—Royal Aero Club Enclosure. K—Reserved Car Park. L—Visiting Aircraft Park. M—Visiting Pilots to report here. N—D.H. Tech. School Enclosure. R—Restaurant (officials and competitors only). S—St. John Ambulance. U—Enclosure Marshals. V—Public Telephones. W—Bookmakers.



Air Force inter-squadron event, the entries for which are detailed in the "Service Aviation" section of this issue.

Race day, however, will not be exclusively concerned with racing. Additional attractions, including a helicopter demonstration, glider display, solo and formation aerobatics, parachute jumping and model-aircraft flying, are billed.

Participating aircraft and their pilots are listed in the accompanying tables. Many veteran machines will be recognized, especially among the pre-war de Havilland and Miles types, but there is a smattering of Geminis, Austers and Chipmunks which raises the various events above the "old crocks" class; and, of course, there is nothing decrepit about the out-and-out speed merchants, especially the Venom and Attacker. Hawkers have a stable of old-timers—Tomtit, Hart and Hurricane—in addition to Frank Murphy's Sea Fury Trainer. Colonel Meille's Ambrosini Trainer is the only non-Commonwealth entry, and the Colonel will find a friendly welcome. His mount is of a type little known here and is reputed to be of the best Italian workmanship.

The first event—the King's Cup Race—is timed for 1.30 p.m., and the programme should conclude at about 6 p.m. Prices of admission range from £2 for a private car and its occupants (non-R.Ae.C. members) admitted to the R.Ae.C. enclosure (£1 for members) to 10s for pedestrians in the same enclosure (members 5s). The admission charge for pedestrians to the public

R.Ae.C. JUBILEE TROPHY RACE

No.	Entrant	Pilot	Aircraft	Engine
99	H.R.H. Princess Margaret	G/C. P. Townsend	Hawker H'cane IIc	R-R. Merlin 24
1	Hawker Aircraft, Ltd.	F. Murphy	Hawker Sea Fury Tr. 20	Bristol Centaurus 18
2	Vickers-Armstrongs, Ltd.	L. R. Colquhoun	S'marine Spitfire 22	R-R. Griffon 61
3	de Havilland Aircraft Co., Ltd.	J. Cunningham	D.H. Vampire N.F.10	D.H. Goblin 3
4	de Havilland Aircraft Co., Ltd.	J. D. Derry	D.H. Venom 1	D.H. Ghost 3

AIR LEAGUE CHALLENGE CUP

No.	Entrant	Pilot	Aircraft	Engine
99	H.R.H. Princess Margaret	G/C. P. Townsend	Hawker H'cane IIc	R-R. Merlin 24
1	Hawker Aircraft, Ltd.	F. Murphy	Hawker Sea Fury Tr. 20	Bristol Centaurus 18
2	Vickers-Armstrongs Ltd.	L. R. Colquhoun	S'marine Spitfire 22	R-R. Griffon 61

S.B.A.C. CHALLENGE CUP

No.	Entrant	Pilot	Aircraft	Engine
3	de Havilland Aircraft Co., Ltd.	J. Cunningham	D.H. Vampire N.F.10	D.H. Goblin 3
4	de Havilland Aircraft Co., Ltd.	J. D. Derry	D.H. Venom 1	D.H. Ghost 3
5	Vickers-Armstrongs, Ltd.	M. J. Lithgow	S'marine Attacker F.1.	R-R. Nene

SIDDELEY CHALLENGE TROPHY

Club	Pilot	No.	Aircraft	Engine(s)	Reg.
Darlington and District Aero Club	T. W. Hayhow	27	Auster Aiglet	D.H. Gipsy Major	G-AMIH
Herts and Essex Aero Club	W. T. Franklin	58	Miles Gemini Ia	2 B'burn Cirrus Min. II	G-AKHV
Lancashire Aeroplane Club	F. Dunkerley	94	Miles Gemini Ia	2 B'burn Cirrus Min. II	G-AKKB
Leicestershire Aero Club	A. E. Coltman	44	Miles Hawk Major	D.H. Gipsy Major I	G-ADMW
London Aeroplane Club	W. P. Bowles	35	Miles Messgr. II	B'burn Cirrus Maj. III	G-AJYZ
London Aeroplane Club	J. Cooper	47	D.H. Moth Minor	D.H. Gipsy Minor	G-AFNJ
London Aeroplane Club	T. R. Hilton	54	D.H. Chipmunk	D.H. Gipsy Major	G-AKDN
London Aeroplane Club	Martin Sharp	59	D.H. Chipmunk	D.H. Gipsy Major	G-AJVD
Newcastle Aero Club	K. C. Millican	74	Percival Proctor III	D.H. Gipsy Queen II	G-ALMS
Redhill Flying Club	E. Westbrook	28	Miles Messgr. IVa	D.H. Gipsy Major Id	G-ALBE
Redhill Flying Club	K. M. Freeman	52	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AITO
Rochester Flying Club	E. Day	68	Miles Hawk Tr. III	D.H. Gipsy Major I	G-AKRV
Southend Municipal Flying School	Dr. W. L. James	1	Chilton	Carden Ford	G-AESZ
Wiltshire Flying Club	P. Q. Reiss	12	D.H. Hornet Moth	D.H. Gipsy Major I	G-ADND
Wiltshire Flying Club	Geoffrey Marler	31	Miles Falcon Six	D.H. Gipsy Six If	G-ADTD
Wolverhampton Aero Club	D. C. Jemmett	39	Miles Hawk Tr.	D.H. Gipsy Major Ic	G-AKPE
Wolverhampton Aero Club	J. H. Ashton	57	Miles Hawk Tr.	D.H. Gipsy Major I	G-ADMN
Wolverhampton Aero Club	R. R. Paine	96	Miles Hawk Speed Six	D.H. Gipsy Six If	G-ADGP

THE FESTIVAL AIR RACES . . .

enclosure is 4s. Private cars to the public enclosures are admitted at £1 with occupants. All admission enquiries and bookings should be made through Auto Parks, Ltd., 1, Maclise Road, Olympia, London, W.14.

Details of extra buses are available from Traffic Enquiries, 55, Broadway, London, S.W.1 (Abbey 1234). For particulars of special trains, application should be made to Mr. L. J. Moorcock, District Passenger Superintendent, British Railways, Liverpool Street Station, London.

The following information may prove helpful to drivers approaching from the towns listed :—

Baldock: Via A.1, Great North Road, to Stanborough, then straight on down A.555, Barnet By-pass to main entrance, on right. *Bedford: Via* A.600, through Hitchin and Welwyn, joining A.1 Great North Road, to Stanborough, then straight on down A.555, Barnet By-pass, to main entrance on right. *Luton: Via* A.6 to St. Albans, turn left at roundabout on to A.414 to Hatfield. Entrance on left off A.414. *Dunstable: Via* A.5, Watling Street, to St. Albans, continue straight on over traffic lights, down A.6 for 1½ miles to roundabout, turn left on to A.405, North Orbital Road, at end of which turn left on to A.555, Barnet By-pass, to entrance on left. *Tring: Via* A.41 to Huntonbridge, straight on down A.500, Watford By-pass, for ½ mile, turn left on to A.405, North Orbital Road, at end of which turn left on to A.555, Barnet By-pass, to entrance on left. *Amersham: Via* A.404 to Rickmansworth, turn left on to A.412, through Watford to Garston, turn right on to A.405, North Orbital Road, at end of which turn left on to A.555, Barnet By-pass, to entrance on left. *Slough: Via* A.412 through Watford to Garston, turn right on to A.405, North Orbital Road, at end of which turn left on to A.555, Barnet By-pass, to entrance on left. *Barnet: Via* A.6, St. Albans Road, to Bignells Corner, South Mimms, turn right at traffic lights up A.555, Barnet By-pass, to Hatfield, entrance on left. *Golder's Green* (North Circular) : *Via* A.500, Hendon Way, or A.555, Watford Way, to Apex Corner, Mill Hill, turn right up A.555, Barnet By-pass, to Hatfield, entrance on left. *Potter's Bar: Via* A.1, Great North Road, to Hatfield, turn left on to A.414 over railway bridge, half a mile on turn right along Wellfield Road to A.555, Barnet By-pass, turn left to entrance on right. *Hertford: Via* A.414, through Mill Green and turn right into Mount Pleasant Lane, cross over A.1, Great North Road, into Spur Road, at end of which turn left down A.555, to entrance on right.

NORTON-GRIFFITHS CHALLENGE TROPHY

No.	Entrant	Pilot	Aircraft	Engine(s)	Reg.
31	Geoffrey Marler	Entrant	Miles Falcon Six	D.H. Gipsy Six If	G-ADTD
33	R. Matthews-Naper	Entrant	Miles Messgr. IIa	B'burn Cirrus Maj. III	EI-AFH
38	R. Blackburn	P. G. Lawrence	Miles Messgr.	B'burn Cirrus Bombdr.	G-ALAC
84	K. Millard	A.Cdre. J. Oliver	Miles Mercury VI	B'burn Cirrus Maj. III	G-AHAA
95	S/L. J. Rush	Entrant	Miles Falcon Six	D.H. Gipsy Six I	G-AECC
96	R. R. Paine	Entrant	Miles Hawk Speed Six	D.H. Gipsy Six If	G-ADGP

GROSVENOR CHALLENGE CUP

No.	Entrant	Pilot	Aircraft	Engine(s)	Reg.
26	A. N. Spriggs	S/L. N. Duke	Hawker Tomtit	A.S. Mongoose 3c	G-AFTA
27	T. W. Hayhow	Entrant	Auster Aiglet	D.H. Gipsy Major	G-AMIH
41	A. N. Spriggs	G. F. Bullen	Miles Whitney Straight	D.H. Gipsy Major I	G-AEUJ
56	Sir G. de Havilland	W. P. I. Fillingham	D.H. Chipmunk	D.H. Gipsy Major 10/2	G-ALWB
97	H. E. Scrope	Entrant	Percival Mew Gull	D. H. Gipsy Six II	G-AEXF

KEMSLEY CHALLENGE TROPHY

No.	Entrant	Pilot	Aircraft	Engine(s)	Reg.
71	R. Blackburn	H. Wood	Percival Proctor 1	D.H. Gipsy Queen II	G-AHVG
81	D. J. Bennett	H.R.H. Prince Alexander of Yugoslavia	Percival Proctor III	DH.. Gipsy Queen II	G-AMCO
88	G/C. the Hon. Max Aitken	Entrant	Miles Gemini IIIb	2 D.H. Gipsy Major 10/1	G-AJTC
90	J. N. Somers	Entrant	Miles Gemini III	2 D.H. Gipsy Major Ic	G-AKDC
91	H.R.H. Princess Margaret	G/C. P. Townsend	Hawker Hart	R-R. Kestrel III	G-ABMR
94	F. Dunkerley	Entrant	Miles Gemini Ia	2 B'burn Cirrus Min. II	G-AKKB
74	K. C. Millican	Entrant	Percival Proctor V.	D.H. Gipsy Queen II	G-ALMS
98	Col. E. Meille (Italy)	Entrant	Ambrosini S.7	Alfa 115cer or D.H. Gipsy Queen 70	

"FIFTY YEARS OF FLYING" DISPLAY

BETWEEN Thursday, July 19th, and Saturday, July 21st, from 2 p.m. to 10 p.m. daily, the *Daily Express* is to present its "Fifty Years of Flying" Exhibition and Display at Hendon Aerodrome. Associated with the *Daily Express* in this ambitious undertaking is the Royal Aero Club, whose jubilee falls this year.

The flying display (7.30 to 9.30 p.m. on July 19th and 20th, and 3.30 p.m. to 5.30 p.m. on July 21st) will embrace ballooning, and flying by many types of pioneer aircraft. Additionally, there will be a "cavalcade of rotating-wing aircraft," a representation of the history of gliding, and a model-flying display.

The static exhibition will include pioneer aircraft (among them famous military machines of both wars), post-war civil machines, historic aero engines, and an Interplanetary Society feature. The history of aircraft design will be traced by models, and there will be a competition for model-makers. The Services will be appropriately represented.

THE M.C.A. STEPS OUT

FOR the 1951 Paris Salon the Ministry of Civil Aviation has had built—by Shawcraft, of Iver, Bucks—what is believed to be the largest scale model of an airport ever produced. It will portray London Airport as it will appear in the future and, being to a scale of 1 : 1,250, will measure 15ft by 8ft. The two runways—No. 1 for take-off and No. 5 for landing—together with the taxiways to and from the central terminal buildings, will be lighted. The line-and-bar approach lighting, both high and low intensity, and runway stop bars, will also be illuminated in their appropriate colours. Model aircraft of various types will be shown at their operational or servicing points; one about to land, one taking off, and others on the ground, will be illuminated. The future central terminal, and other main buildings, will be shown in coloured relief.

The various lights will be shown in four phases: (1) under good visibility at night; (2) under bad visibility at night; (3) future buildings, in addition to the lighting under (2); (4) general floodlighting of the airport from a canopy covering the model.

On its four sides the model will be flanked by photographic and diagramatic information concerning many aspects of London Airport activity, including present amenities, British aircraft, radio and radar aids, air-traffic control, lighting, architecture, and statistics showing the increase in aircraft, passenger and freight movements in the London area to date.

FRENCH INVENTIONS

IN a specially issued bulletin (No. 22A), the S.N.C.A.S.O. organization give brief particulars of a series of patents for which the Société are prepared to grant licences. Descriptive notes on the several inventions are given in English (the standard of translation is high) and many of the notes are accompanied by diagrammatic illustrations.

The inventions covered by the bulletin comprise the following : a high-lift device operated by combined suction and blowing; fuel-control systems, a directional-control system, and a stabilizing device for helicopters; a jet-pipe duct; a variable-area orifice for a jet-pipe; wing-tip stabilizers for aircraft employing bicycle (tandem) undercarriages; a method of flap articulation; two forms of air brakes; a method of attaching thin sheets; an ejector seat; an airtight door and a pressure control valve for use with pressure cabins; an automatic quick-release unit and a mechanical ejection system for parachuting; a strain-gauge dynamometer; a device for the protection of spray-painters against toxic fumes; and a device for lighting and heating the interior of an aircraft (for workmen) during construction.

Further technical data on these inventions and information regarding financial agreements can be obtained from : M. le Chef du Service des Ventes de la S.N.C.A.S.O., 105, Avenue Raymond Poincaré, Paris, 16ème.

SERIAL 3

S 11 TRAINER HAWKER SEA FURY and GLOSTER METEOR production—photos by courtesy of N.V. Koninklijke Nederlandsche Vliegtuigenfabriek Fokker, Holland.

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THE ROYAL TOURNAMENT

R.A.F. and Naval Aviation Represented in a Full and Varied Programme

IT would be invidious to single out any one event from an excellent and varied programme—a worthy presentation of the Royal Tournament for the Festival year. Certainly there is much to delight and thrill visitors of all ages, and ever-popular perennials include the naval field gun competition—as exciting as ever, and this year between Naval Aviation and Chatham—and the musical drive by the King's Troop, Royal Horse Artillery. The dashing displays by motor cyclists of the Royal Signals, Catterick, on their immaculate machines are clearly becoming favourites with many spectators, and it is not only dog-lovers who appreciate the obedience of the R.A.F. Police Alsatians which, it was learned, were not specially trained for their parade, but had this year been drawn from regular patrol work less than four weeks before the Tournament opened, and in 50 per cent of the cases were controlled by National Service airmen.

The Animal Transport Company of the R.A.S.C. provide a truly remarkable display of trick riding, which demands clean and fearless jumping by man and horse alike. The colour of the massed pipes and drums of Scottish regiments and the massed bands of the Royal Military School of Music is quite breathtaking, even without the charming Highland dancing by young boys of the Queen Victoria School of Dunblane.

The young men taking part in the less spectacular Royal Air Force display of physical fitness and in the precision drill display by recruits of the King's squad of Royal Marines, are nevertheless to be congratulated on the high standard of their performance. Fortunately no such ghastly mix-up as that depicted on the Tournament poster and programme cover occurs even in the maze marching.

With no special intention of being gallant, it may be remarked that the absence of women from any of the three Services was a matter for regret this year.

This Royal Tournament—the event is now in its 61st year—opened at Earls Court on June 6th, when Her Majesty the Queen, Princess Margaret, and King Haakon of Norway were present. It continues until June 23rd, performances being at 2.30 p.m. and 7.30 p.m. daily. Before evening performances, cadet bands play in the arena. No. 61 (Eastern) Group Trumpet and Pipe Band of the Air Training Corps play on June 8th, 12th and 21st, while the Apprentices' Pipe Band of No. 1 School of Technical Training, R.A.F., Halton, play on June 16th. This band, incidentally, was formed in 1922, and besides its duties at Halton and on ceremonial parades, performs regularly at charity and other functions. Its well-known mascot, a Welsh mountain goat, is named Lewis II.

Outside the imposing arena in the Earls Court exhibition hall are a number of stands and sideshows concerned with Service activities and recruiting.

THE PLACE OF PLASTICS IN AIRCRAFT

SPEAKING on "The Place of Plastics in Industry" at the opening of the British Plastics Exhibition and Convention, Sir Ben Lockspeiser, K.C.B., F.R.S., secretary of the D.S.I.R., remarked at some length on the value of plastics in aircraft construction.

Early in the war, he said, the continued uncertainties of the Atlantic crossing led to concern for the future supplies of balsa wood—needed, on account of its low density, as supporting pieces for the wooden sandwich construction of the Mosquito. The necessity to find a lightweight substitute for balsa eventually led to the adoption of foamed calcium alginate as the supporting material, but the investigation into the theory and the practical problems of sandwich construction also led to the more exact specification of core material. As a result, increasing use was now being made of this method of construction, and there was little doubt that wider application could in some instances save up to 50 per cent of timber; at the present level of world prices for timber, the production of synthetic hard foams already being used as insulation panels might prove economic for more general usage.

Reference to the Mosquito, continued Sir Ben, brought to mind other interesting developments in the production of aircraft. The waterproof properties of laminated wood and the strength and wear-resistant properties of densified wood bonded with synthetic resin were by now well known. We were not likely to return to the use of animal glue in this field. The great success of plastic bonding, wood-to-wood, led quite early in the war to experimental work on the bonding of metal to wood for certain parts of the Hornet, and later to the bonding of metal to metal in the Dove.

Finally, in the Comet, the elimination of drilling and of riveting in the construction of the shell by bonding metal to metal has been carried to its maximum by the Redux process. The saving in time, labour and cost in the assembly of metal plates and shapes to each other and to the stringers was estimated to approach 50 per cent, and the task of inspecting each of the thousands of rivets formerly used is avoided. Moreover, the area of contact extended over the whole surface concerned, and the joint was thereby the stronger. The importance of the saving in weight of up to about 20 per cent on the whole shell needed no emphasis. All these advantages, concluded Sir Ben Lockspeiser, outweighed the high capital costs incurred in providing presses, steam generators, tools, foundry and cleaning equipment.

The British Plastics Exhibition and Convention, now in progress at Olympia, London, ends tomorrow, June 16th. It is organized annually by *British Plastics*, an Associated Iliffe Press publication.

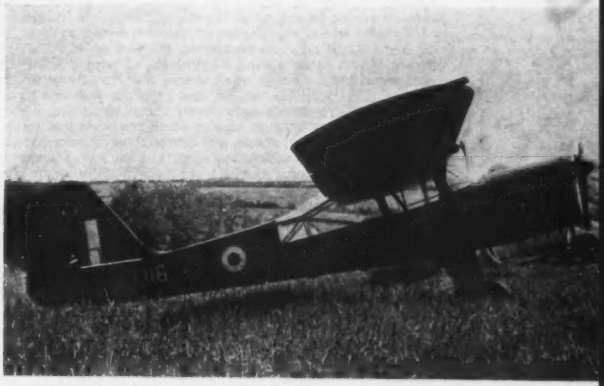
NEW AUSTERS

OUR account of the Auster Flying Club Festival Year Display in the preceding issue referred to two new Auster types—the military Model S and the Aiglet Trainer. A few additional particulars are now available.

The Model S originated as a private venture and is Auster's interpretation of the Army's requirements as laid down in the appropriate specification. The Cirrus Bombardier engine appears to give abundant power and so far, it is reported, results of performance and handling tests amply justify the estimates put forward by the firm.

The Aiglet Trainer, a direct development of the standard Aiglet, is claimed to be the only British elementary trainer embodying the following features: side-by-side seating for pupil and instructor; provision for full instrumentation and two-stage amber or blue instrument-flying equipment; and sufficient performance to enable it to do all aerobatics without losing height.

The first machine of the type has been on test for some time and its performance promises a successful career in many parts of the world. Reference has already been made to the Aiglet Trainer's clipped wings and cleaned-up strut arrangements.



Unmistakably an Auster, the Model S (Cirrus Bombardier) is our newest A.O.P. prototype.

THOUGHTS BEFORE THE SALON

Musings and Conjectures à Propos the Imminent Manifestations in Paris

ONE can never foretell just what will turn up in the Paris Salon, though one may devour every scrap of prior publicity and badger every exhibitor for weeks beforehand for the hottest tips. In any case, the declared lists of exhibits never betray those intriguing little secrets which always achieve their first mushroom growth in the form of models or "artist's impressions." But there is no doubt that the assorted spies and designers' narks (if the term may be forgiven), who derive as much stimulation and profit from the show as the citizens of Paris derive pleasure (especially on Saturday afternoon), will again be rewarded.

We may be sure that there will be a few genuine airworthy machines with real engines which, if suddenly started, would raise such a gale of pamphlets, signboards, aspidistras, small boys and *gendarmes'* caps as would make the Festival Pleasure Gardens look like a Wilbur Wright memorial lecture. Then, of course, there will be as it were the *demi-mondaines*, partly of honest metal, part *contre-plaqué*. These, one is always given to understand, will take the air "shortly after the Salon," but are rarely met with again (and even then changed almost beyond recognition) until a year or two later. And last there will be those unashamed, gaudily painted, overgrown models, full of promises, calculated to seduce the sober student from the paths of technical righteousness.

But who would have it otherwise? The Salon is surely the perfect complement to the Farnborough display—that fresh vista of dear old English marquees and the setting for performances as honest-to-goodness as those of Shires at the Bath and West itself.

The French, of course, are very adroit at taking us on at our own games and showing us up before our friends, and at their flying display, at Le Bourget on July 1st, we may count on some dashing, if not always edifying, displays by some of the newest offerings of French industry. The Atar-engined Dassault Ouragan fighter is promised, but we must wait and see if the intriguing Aladdin and Mystère will be shown the light of day. In fact, the purely military exhibits, both at Le Bourget and in the Salon, remain for the present provocatively veiled. One cannot help wondering if the massive, projectile-like S.E. 2410 Grognard, twin-Nene precursor of a heavy fighter and a light bomber, will occasion such heart-fluttering as did the smaller Espadon and Triton at the Orly display two years ago.

As usual, the more charming debutantes will be of sporting persuasion, with Fouga's jet-powered Cyclope II and Gemaux I (exquisite names!) as perhaps the most desirable of all, though ill-equipped for workaday tasks. Technical novelties may include bold helicopter developments, the latest Hurel-Dubois, of ultra-high-aspect ratio, and the articulated-wing Rey 01.

The fullest dossier available to date lists some 150 exhibitors, among them Fokker from the Netherlands, Fiat from Italy, and America's Douglas and Bell. The bulk of participants, of course, make accessories and ancillary equipment, and it is among such exhibits that much of the business will be done, for, with the exception of small aircraft and engines, over-the-counter buying is now only a happy recollection.

Modern aircraft—especially those designed to operate at the upper levels—are posing all manner of embarrassing equipment problems, and it may be that, with Gallic resourcefulness, our French friends have evolved some interesting and valuable solutions. So the "sideshows" and gallery should be especially worthy of patronage this year.

Briefly, then, it seems that the Salon will retain the character of former years, with the orthodox shown wing-to-wing with the novel. What is lacking there indoors should, to a large extent, be supplied by the flying display at Le Bourget; so, given a due measure of sunshine and francs, the British visitor, be he technical or commercial, or merely enthusiastic, should find his trip worth while. H.F.K.

THE STORY OF No. 5 GROUP, BOMBER COMMAND

A Record of Determination and Courage

IT is not necessary to have been in Bomber Command to appreciate this story* of one of its outstanding Groups—No. 5. Moreover, many of the great exploits will be familiar to everyone, though the details, newly revealed, will intensify the appreciation of the tales of the achievements of such leaders as Gibson and Cheshire, to each of whom was awarded the Victoria Cross. Accounts of the breaching of the Mohne Dam, the destruction in a daylight raid of the U-boat engine factory at Augsburg, the vital night attack on Peenemunde and the sinking of the *Tirpitz* will not fail to bring a thrill of pride to all who read of such determination and courage, while others who have flown on such raids will live again the anxiety and suspense followed by the satisfaction arising from a difficult task manfully tackled.

The author's job is never an easy one when dealing at second-hand with histories and events, and recollections of the individuals concerned often differ widely on a single incident. W. J. Lawrence has recorded many of 5 Group's exploits faithfully in the space available.

There is a risk that readers may be left with the impression that in the latter years of the war 617 Squadron was virtually 5 Group and vice versa. Admittedly this squadron tackled many of the most hazardous operations and nearly all the spectacular ones, and so rightfully deserves a major part of the chronicle to be devoted to it. The varied and vital raids by the rest of the Group (usually operating without 617 Squadron) towards the end of the war, however, tends to be dismissed in a few general observations, and a detailed description of ever-developing technique most revealing even today to a potential enemy.

It has been left to the V.C.A.S., Air Chief Marshal Sir Ralph Cochrane, who was A.O.C. 5 Group during 1943-44, to mention by name in his foreword one outstanding Master Bomber of the later period who incongruously finds no place in the body of the book. Sir Ralph's foreword in a few paragraphs admirably captures the atmosphere and spirit in the Group.

One inaccuracy in the closing chapters needs correction, namely, the reference to bomb aimers carried in 627 Squadron Mosquitoes. These low-level markers used a dive-bombing technique, and indicators were aimed and released by the pilot. The second crew man was a navigator who also assisted the pilot in every way, even to selecting—on the panel behind the pilot's head—the T.I.s for release. The squadron appointed a Marker Leader, a pilot who assisted the master bomber and was capable, if the need arose, of taking over from him. Among omissions from this outline history may be mentioned the anti-shipping raids in the Baltic Sea and Oslo Fjord.

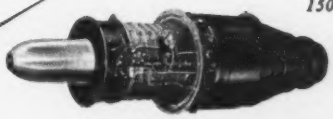
The book comes to an end with a mention of Bomber Command's operation directed against Keil on April 26th, and the commencement of preparations for "Tiger Force." It may be appropriate to add that the last operation tackled by 5 Group was, we believe, against Tonsburg in the Oslo Fjord on the night of April 25th. In some respects this was typical of the later stages of the Group's operations, entailing as it did in the first place the destruction of a small coastal oil storage depot for submarines, and in the second place extreme care to avoid dropping a single loose stick of bombs which might have caused damage to a friendly Norwegian village a few hundred yards away.

* *"No. 5 Group, R.A.F. (1939-1945)," by W. J. Lawrence. Faber and Faber, Ltd., 24, Russell Square, London. Price 15s.*

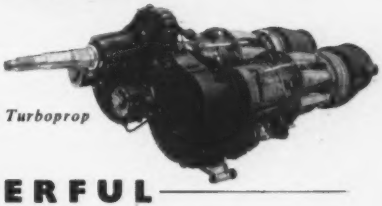
POWER *development*

MAMBA *Turboprop*
1400 e.s.h.p.

POWERFUL



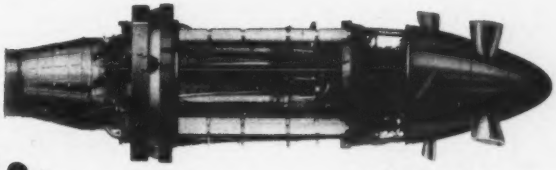
VIPER *Turbojet*
1500 lb thrust



DOUBLE MAMBA *Turboprop*
2800 e.s.h.p.

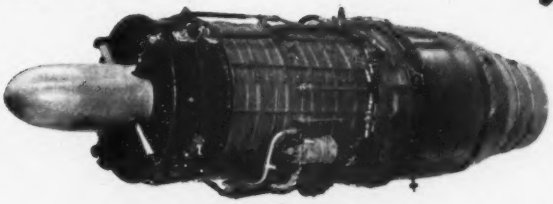
MORE POWERFUL

THE MOST POWERFUL



PYTHON *Turboprop*
4110 e.s.h.p.

SAPPHIRE *Turbojet*
7200 lb thrust



gas turbine engines

by ARMSTRONG SIDDELEY

PARKSIDE · COVENTRY

Member of the Hawker Siddeley Group

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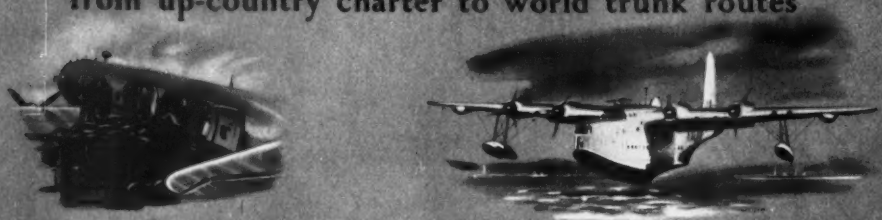
from up-country charter to world trunk routes



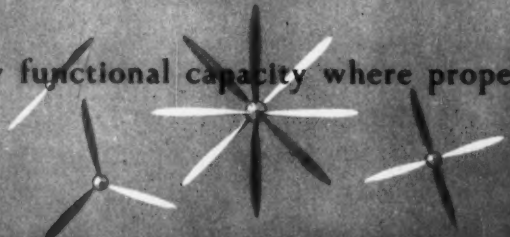
In Transport and Coastal Commands

In civil and military training

In fighting and bombing

In ocean operations from ship and shore

In every functional capacity where propellers are used



DE HAVILLAND PROPELLERS
are pulling the loads

PRELUDE TO PARIS

Promise of a Fine Exhibition and Display: Current Activities and Exports of Leading British Manufacturers

CONDITIONS now differ greatly from those prevailing at the time of the previous Paris Show in 1949, and Britain and America have embarked reluctantly upon a great rearmament effort and in particular a re-expansion of their aircraft industries. It is Britain's intention, in common with other Western Union nations, that the combined Allied Air Forces shall be sufficiently strong to discourage any threats of aggression.

Although the renewed exertions of the British industry are concerned mainly with military production, post-war planning and efforts in the civil field have now reached the stage of fruition, and several exceptionally fine commercial aircraft types are being built in considerable numbers. It may be assumed also that an increasing amount of the manufacturers' design and productive capacity is now being devoted to secret aircraft and missiles.

It is *Flight's* intention to bring to readers next week a first-hand review of the aircraft, engines and equipment—primarily French, but also British and of other nationalities—which will be seen at the Paris Exhibition in the Grand Palais. Additional information about the static park and flying display (on July 1st) at Le Bourget will follow.

As always, the French can be depended upon to spring some surprises at Paris and to display the originality for which their engineers have long been noted. New gliders and helicopters are expected to be of special interest. It is feared, though, that nothing so encouraging or tangible as a production line of French-designed fighters can as yet be seen. America, Holland and Italy are among other countries which are to participate in the Paris Show, and the products of all these, as exhibited by some 150 separate companies, will be discussed in our report next week.

There follows a guide to the current activities of the principal British manufacturers in alphabetical order; a mention, where appropriate, of their Paris exhibits and arrangements; and an indication of their more recent exports.

Many of the latest British civil and military aircraft can only be shown at Paris in model form, but the industry is expected to be well represented in the flying displays at Le Bourget. The guide which follows will serve as a background to the British exhibits and will also provide additional information for the benefit of potential customers visiting Paris at this time. In view of the close co-operation now existing between the Western European countries, the pooling of many resources, and the move towards standardization, the aviation products of each are the more interesting to all.

AIRSPEED, LTD.

REGARDED as one of the most handsome commercial aircraft ever to be designed, the Ambassador, Airspeed's principal product, is about to be delivered (albeit a little late) to British European Airways. A slightly modified tailplane has been fitted recently. During one period of testing an Ambassador flew 52½ hours in five days.

The aerodynamically clean airframe has resulted in high performance at 52,000 lb (23,600 kg) a.u.w. on the power of two Bristol Centaurus radials. That the Ambassador (known by B.E.A. as the Elizabethan) has several appealing qualities from the passenger's point of view is now well known.

Between September, 1946 and the corresponding month of 1947 the company's exports were to the value of £350,587.

Countries to which Airspeed products have been sent since the war are: Argentina, Belgium, Burma, France, Holland, India, Indo-China, Norway, Portugal, Spain, Turkey and the British Commonwealth.

Address: *Christchurch, Hants*, and *The Airport, Portsmouth, Hants.* At Paris: *No stand.* Representative: *Monsieur A. Costa de Beauregard, 33 Avenue des Champs Elysées, Paris, 8e.*

ALVIS, LTD.

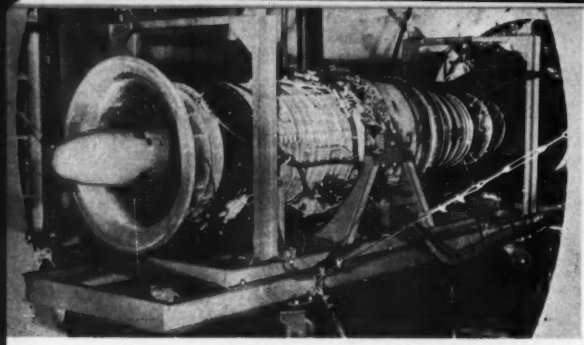
THIS company is going through a most eventful period as a result of the greatly increased activity in the helicopter world and of the adoption of a new and more powerful basic trainer for the R.A.F. The Alvis Leonides radial, of which there are several marks, designed to run either with shaft vertical or horizontal, is well suited to provide the power in both cases. The new Percival basic trainer is named the Provost, and helicopter types include the Bristol 171, Westland-Sikorsky S.51 and the two-engined Bristol 173. Numbers of Leonides-powered Princes—light multi-purpose twins—are now coming off the line.

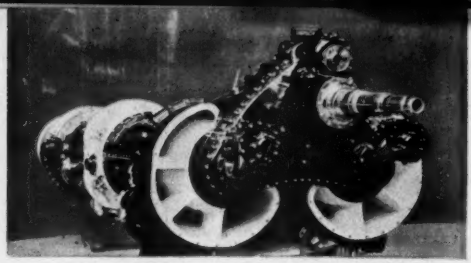
In the near future, announcements regarding much-expanded production and possibly a new, more powerful, helicopter engine may be made.

Address: *Holyhead Road, Coventry.*

Alvis Leonides helicopter power unit as built for the Bristol 171.

(Below) Airspeed's beautiful twin-engined airliner, the Ambassador, resplendent in its B.E.A. colour scheme.





(Left) Most powerful British turbojet, the Armstrong Siddeley Sapphire, here seen in a test cell of the Wright Aeronautical Corporation of America. (Above) The Armstrong Siddeley Double Mamba turboprop for Naval Aviation.

PRELUDE TO PARIS . . .

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT, LTD.

TWO very different types of aircraft are the current products of Armstrong Whitworth : the 26/41-seater Apollo airliner (four Mamba turboprops) and the night fighter Meteor N.F.11. The company—a member of the Hawker Siddeley Group—has also contributed notably to the country's research programme with the A.W.52 jet flying wings. Models of all are being shown at Paris.

Trials with the Apollo are well advanced, and the aircraft visited Paris-Orly some time ago. Production of the Meteor N.F.11 has been speeded up in view of the shortage of night fighters in the Western Union countries.

Such products of this company as could be spared for export have gone to the Argentine.

Address: *Baginton, near Coventry.*
At Paris: *Stand No.* 28. Representative: *G. H. Morel, Société Commerciale et Industrielle Franco-Britannique,* 48 *Avenue Raymond Poincaré, Paris XVIe.*

ARMSTRONG SIDDELEY MOTORS, LTD.

AMONG the earliest manufacturers of aircraft engines, Armstrong Siddeley are now almost entirely concerned with gas turbines, both turbojets and turboprops. The latest addition to the list is the small Viper expendable turbojet for special purposes, but of world-wide interest now are the Sapphire and Double Mamba, both of which are in production and are to be seen at Paris. The former, an axial turbojet type-tested at 7,220 lb thrust, is one of the most important items in British and American defence production, while the Double Mamba may well be adopted equally widely as the power unit of the Fairey 17 anti-submarine aircraft selected for the Royal Navy and being studied closely by several other countries. The Python, a large turboprop in the 4,500 e.s.h.p. class, is being produced for the Wyvern Naval strike fighter.

During the last five years the company has exported to America, France, Switzerland, Sweden, Denmark, Spain, Belgium, Belgian Congo, Argentina, Egypt, India, Pakistan, and Afghanistan.

Address: *Coventry.*
At Paris: *Stand No.* 44 *Grande Nef.* Representative: *Lt.-Col. Francois Gousault, Société Franco-Britannique,* 48 *Avenue Raymond Poincaré, Paris XVIe.*

AUSTER AIRCRAFT, LTD.

BRITAIN'S most prolific light-aircraft manufacturer, the Auster company offers a number of current civil and military variants, all of the single-engined high-wing configuration. Of the newer designs, the four-seat Autocar tourer with Gipsy Major engine, and the Aiglet—an economical, versatile and lively machine also with Gipsy Major—are noteworthy.

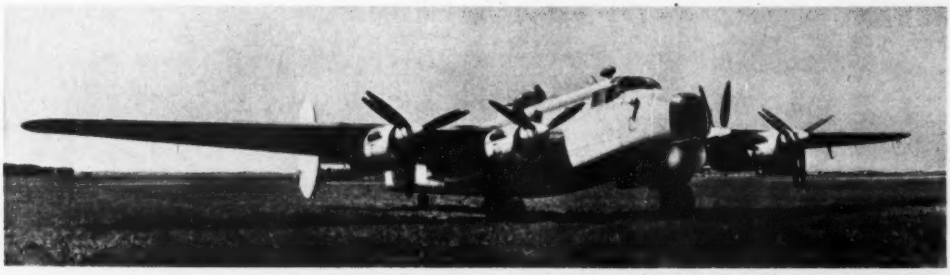
Entirely new is the Aiglet Trainer with clipped wings, full blind-flying equipment and side-by-side seating. It is fully aerobatic and has unusually pleasant controls. A new larger type, the Model S, with Cirrus Bombardier engine, is undergoing military trials. The Royal New Zealand Air Force operates Auster floatplanes.

The company have exported to the following countries since the war : Canada, Iceland, West Indies, Cuba, Brazil, Argentina, Uruguay, Norway, Sweden, Finland, Denmark, Holland, Belgium, France, Spain, Portugal, Italy, Morocco, Algeria, Tunisia, Egypt, West Africa, Nigeria, Equatorial Africa, Rhodesia, Mozambique, Reunion, Belgian Congo, Angola, South Africa, Pakistan, India, Iraq, Iran, Burma, Malaya, New Guinea, Australia, New Zealand, Tasmania, Ceylon, Falkland Islands, Switzerland, Transjordan, Syria, Palestine, Uganda, Siam, Kenya, Sierra Leone, Jamaica.

Address: *Rearsby Aerodrome, Rearsby, near Leicester.*

BLACKBURN AND GENERAL AIRCRAFT, LTD.

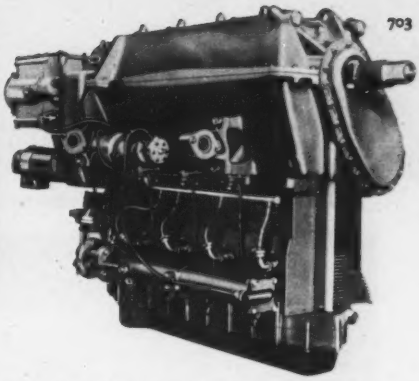
NOT solely by reason of its huge size but also because of its unusual capabilities, the Universal Freighter is at this time of especial interest to many countries. Its disposable load of some 40,000 lb (18,150 kg) together with ramp-loading from the rear and a take-off or landing run (confirmed on tests) of 1,000 yd, open up unique possibilities for the rapid transportation of men or materials. This aircraft is truly an air cargo-liner. Moreover, it is only at the beginning of its development life, and with bogie



"Flight" photograph

(Above) Now in service with the R.A.F., the Avro Shackleton has four Rolls-Royce Griffons. (Left) Trials of the Armstrong Whitworth Apollo are nearing completion. It has four Mamba turboprops. (Below) Wings of reduced span with tidier struts are characteristics of Auster's new Aiglet primary trainer.

"Flight" photograph



(Above) Excellent progress has been made with the prototype Blackburn and General Aircraft Universal Freighter, which has four Bristol Hercules engines. (Right) Unique among light engines is the 185 h.p. Blackburn Cirrus Bombardier, with direct fuel injection.

landing-gear, and possibly more powerful engines, it should be able to maintain or better the present performance with considerably increased load.

CIRRUS ENGINES

Cirrus Engines, having firmly established the Cirrus Minor and Major engines in their respective 100 h.p. and 150 h.p. classes, proceeded to turn their attention to a new line of units with direct fuel injection and many other modern design features. First came the 185 h.p. Bombardier, which is soon likely to be offered, in addition, with constant-speed airscrew. The first of the six-cylinder engines in the series is running, and has reached the type-test stage. Bombardiers are installed in the prototypes of the Auster Model S and the Skeeter helicopter, and also in a Messenger.

Direct Cirrus exports have been made to: Sweden, Denmark, Australia, Italy, Ireland, Uganda, Switzerland, Iraq, Trinidad, Spain, Kenya Colony, Singapore, Madagascar, Lebanon, Norway, New Zealand, Egypt, Equatorial French Africa, Rhodesia, France, Canada, Colombia, Argentina, India, Finland, Belgium, and important new orders are being negotiated. Fitted in a variety of light aircraft, Cirrus Minors and Majors have been sent to almost every country in the world.

Address: *Brough, East Yorks.*
At Paris: *Stand No.* 33. Representative: *Société Commerciale et Industrielle Franco-Britannique, Paris XVIe.*

BOULTON PAUL AIRCRAFT, LTD.

THIS company's energies have been devoted largely to the design, development and production of the Balliol advanced trainer for the R.A.F. In production the Rolls-Royce Merlin is fitted, but a Mamba prototype has also been flown extensively. A Naval version has also been developed (see illustration). The Balliol T.2 and Sea Balliol T.21 are in production for the appropriate Services.

In addition, one of Britain's three new delta-winged research aircraft,—the P.111—bears the name of Boulton Paul, and other research work has been done on a sub-contract basis—on Vampire intakes for the Vampire and gust alleviators for example.

Address: *Wolverhampton.*

THE BRISTOL AEROPLANE CO., LTD.

A GREAT variety of aircraft have been, and are being, produced by this important concern, and it is hoped that among others of their design the mighty Brabazon (trials with which are progressing satisfactorily) will be seen in France during the period of the Paris Exhibition. Both single- and twin-rotor helicopters have been constructed, namely the types 171 and 173 respectively, of which the last-named is entirely new this year.

In another class the Freighter 170 Mark 31 is the latest version of this widely-used and versatile commercial aircraft. To mention but two very successful applications, Air Beef in Australia and the Channel car ferry (Silver City Airways) may be named.

Good progress is reported with the construction of the first Bristol 175 airliner (four Proteus turboprops) for B.O.A.C.

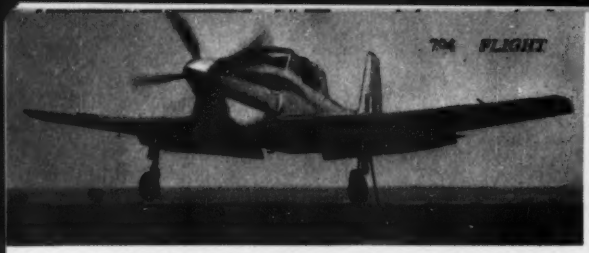
Aircraft have been exported to: Australia, Pakistan, India, New Zealand, Saudi Arabia, France, Sweden, Turkey, Portugal, Saint Dominican Republic, Spain, South Africa, West Africa, Argentina.

BRISTOL ENGINES

In the engine field the company are among Britain's major constructors, both of piston units and gas turbines. Entirely new, and so far security-cloaked, is the Olympus turbojet. The Proteus, of which an example is shown at Paris, is a turboprop being developed for the Type 175, Princess and Brabazon II. It is in the 3,500 h.p. class and is designed to give low fuel consumption.

Hercules and Centaurus sleeve-valve radials, also being exhibited are too well known and numerous in their applications to need introduction here. Latest marks are the Hercules 763 as fitted in B.O.A.C. Hermes IVs, and Centaurus 661 for Ambassadors.

(Right) Production version of the Bristol Type 171 Mark 3 helicopter. (Lower right) Hercules 734s power the latest version of the Bristol Freighter Type 170 Mark 31. (Below) Civil Centaurus 661 as installed in the Ambassador. Its maximum rating is 2,700 b.h.p.



Boulton Paul Balliol trainer, Naval version (Rolls-Royce Merlin).

The Chrislea Skyjeep is a versatile light four-seater.

A delightful study of the de Havilland Comet four-Ghost-turbojet airliner soon to be delivered to B.O.A.C.

"Flight" photograph

PRELUDE TO PARIS . . .

Engines have been exported to: Australia, Canada, Pakistan, India, New Zealand, Egypt, Saudi Arabia, Iraq, France, Denmark, Holland, Turkey, Spain, South Africa, Rhodesia, Indo-China, Brazil, Argentina, U.S.A., Sweden, Eire, and Iran.

Address: *Filton House, Filton, Bristol.*
At Paris: *Stand Nos. 30 and 40.* Representative: *Société Commerciale Industrielle Franco-Britannique, 48 Avenue Raymond Poincaré, Paris, 16e.*

THE CHRISLEA AIRCRAFT CO., LTD.

ONE of the smaller, but energetic, producers of light aircraft in England, Chrislea have combined in their four-seater Skyjeep many detail refinements and a remarkable degree of utility. Cirrus Major III power is employed, and the decking of the rear fuselage can be raised for loading and accommodating a full-sized stretcher with patient.

A near-relation with the characteristic twin fins and rudders, but in this case with a nosewheel layout, is the Super Ace Series 2. A 145 h.p. Gipsy Major 10 engine is fitted.

Aircraft have been exported to Argentina, Brazil, Uraguay, Australia, New Zealand, Malaya, Pakistan, Switzerland, Kenya and S. Rhodesia during recent year.

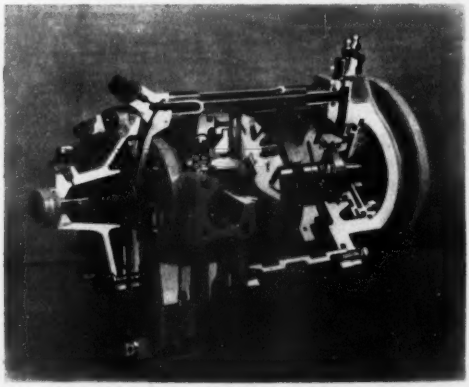
Address: *Exeter Airport, Clyst Honiton, Devon.*

THE DE HAVILLAND ENTERPRISE

AIRCRAFT, engine and airscrew divisions go to make up the de Havilland Enterprise, and a great variety of types of civil and military products emerge from each branch. Pride of place must be given to the Comet, now in production for B.O.A.C. in Mk. I (Ghost) and Mk. II (Avon) form, and for Canadian Pacific, Panair do Brasil and Union Aero Maritime de Transport of France. It is to be demonstrated at Le Bourget on July 1st. Dove feederliners are being operated in many parts of the world and demand for them is growing. Already 300 have been exported. The four-engined Heron follows.

In the military field, Goblin-powered Vampires are now familiar in shape and sound to most of the free peoples of Europe, and the British Commonwealth. The Ghost-powered Venom, a development with much increased performance, particularly at high altitude, has now been developed in Sea Venom and Venom night fighter variants. These are being studied at present by the French industry and French Navy. Production has commenced for the British Services. New this year also is the Vampire side-by-side trainer which may soon be in as great demand as the attractive Chipmunk primary trainers built for the R.A.F. Reserves and several foreign services.

Exports and licensing agreements for de Havilland aircraft



A fine example of Dowty ancillary products for aircraft and engines is this Armstrong Siddeley Sapphire turbojet fuel pump.

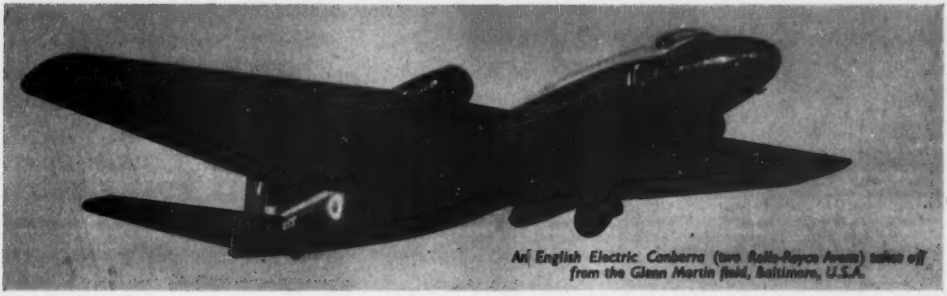
(Below) One of the many Chipmunk primary trainers to serve abroad. This example carries Danish markings.

A successful civil or military turbojet, the 5,000-lb. thrust D.H. Ghost.

"Flight" photograph

Eon Olympia sailplane made by Elliotts of Newbury, on a delivery flight.

A Fairey 17 anti-submarine three-seater approaches for a carrier landing.



An English Electric Canberra (two Rolls-Royce Avons) takes off from the Glenn Martin field, Baltimore, U.S.A.

are as follows : Aircraft have been exported to Argentina, Australia, Azores, Belgium, Brazil, Burma, Canada, Ceylon, Chile, Denmark, Dominica, Egypt, France, India, Iraq, Italy, Jordan, Kenya, Lebanon, New Zealand, Nigeria, Norway, Pakistan, Persia, Portugal, Rhodesia, Siam, South Africa, Sudan, Sweden, Switzerland, Tanganyika, Turkey, U.S.A. and Venezuela. Vampires are now being built under licence in Australia, France, India, Italy, and Switzerland, and the Venom is to be built by Italy and Switzerland. The Canadian company has exported to Argentina, Australia, Belgium, Brazil, Columbia, Egypt, Finland, India, Indo-China, Indonesia, Lebanon, Malaya, New Zealand, Peru, Rhodesia, Siam, South Africa, U.S.A. and Uraguay.

DE HAVILLAND ENGINES

Many countries, unlike Britain, have been slow to accept the fact that turbojets as well as turboprops are now ready for commercial transports. In the Salon de Havilland is showing a Ghost as developed for the Comet airliner.

Goblins, like the Vampires they power, are to be found in many countries, though not yet in so many as the range of small piston engines of de Havilland design, the ubiquitous Gipsy Majors and the Queens, as installed respectively in Chipmunk trainers and Doves, for example. Engine exports since the war have been to the following countries : Argentina, Australia, Azores, Belgium, Brazil, Burma, Canada, Ceylon, Chile, Denmark, Egypt, France, Holland, India, Iraq, Italy, Jordan, Kenya, Lebanon, New Zealand, Nigeria, Norway, Pakistan, Persia, Portugal, Rhodesia, Siam, South Africa, Spain, Sudan, Sweden, Switzerland, Syria, Tanganyika, U.S.A., Venezuela, Yugoslavia. The Goblin and Ghost are being built under licence in Sweden, and the Ghost is to be built likewise in Switzerland and Italy.

DE HAVILLAND AIRSCREWS

The advent of jet propulsion would, in the opinion of some people, put an end to all airscrews, but that day, if it is to come, is still far off. Certainly the demand is now mainly civil. Latest developments are in large hollow-steel-bladed airscrews and such installations for the Bristol 175 and S.R.45 Princesses are being prepared. Much work remains to be done, also on providing satisfactory airscrews for other turboprops.

On de Havilland's airscrew export list are the following countries : Argentina, Australia, Azores, Belgium, Brazil, Burma, Canada, Chile, Dominica, Egypt, France, Holland, Hong Kong, India, Indo-China, Iraq, Italy, Jordan, Kenya, Lebanon, New Zealand, Nigeria, Norway, Pakistan, Persia, Peru, Portugal, Rhodesia, Saudi Arabia, South Africa, Spain, Sweden, Tanganyika, Tasmania, Turkey, U.S.A., Yugoslavia.

For all the D.H. companies' exports since the war, a figure of £50 million in value is quoted up to March this year.

Address: (*Aircraft and airscrews*) *Hatfield, Herts.*; (*Engines*) *Stonegrove, Edgware, Middlesex.*

At Paris: *Stand No.* (*Engines*) 18. Representative: *Monsieur A. Costa de Beauregard, 33 Avenue des Champs Elysées, Paris 8e.*

DOWTY EQUIPMENT, LTD.

PARIS visitors will be able to examine a very representative selection of Dowty ancillary equipment beginning with the primary products—landing-gear, large and small, together with jacks and liquid springs.

Illustrated on page 704 is a very interesting gas turbine Duplex fuel pump type ENG-129—another Dowty line—in this case designed for the Sapphire. This compact pump, one of a range, is of the positive-displacement multi-plunger type; it is suitable for kerosene or petrol and requires no lubricant. At 3,500 r.p.m. it delivers 1,500 Imp. gall/hr of kerosene.

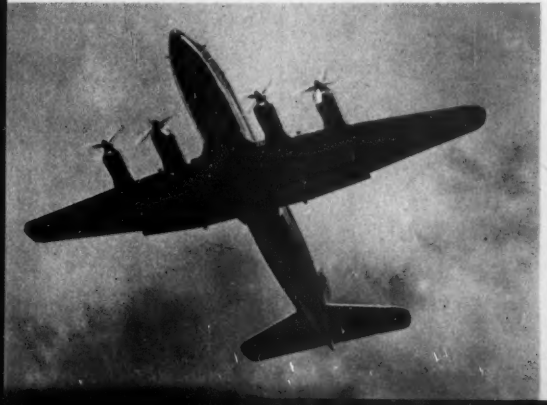
Current rate of exports for Dowty Equipment, Ltd., is £250,000 per annum, and almost every country is concerned.

Address: *Arle Court, Cheltenham, Glos.*

At Paris: *Stand No. 1, Balcony H.*

(*Continued on page 708*).

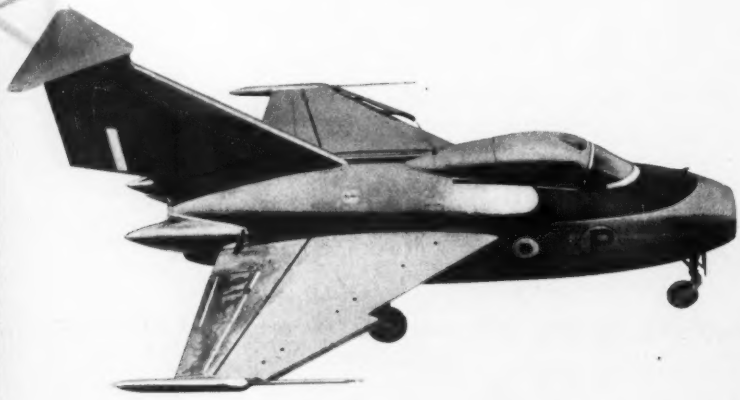
Handley Page Hermes V (four Theseus) climbs steeply after take-off.

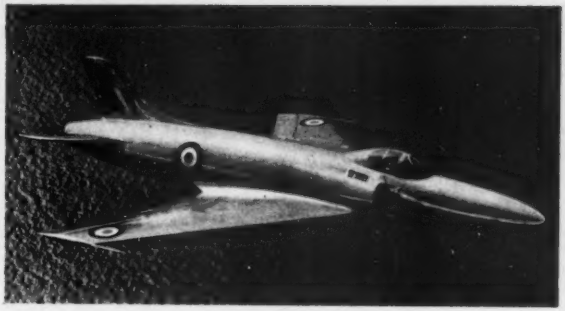


Meteor 8s for Denmark at 30,000ft on a recent delivery flight.

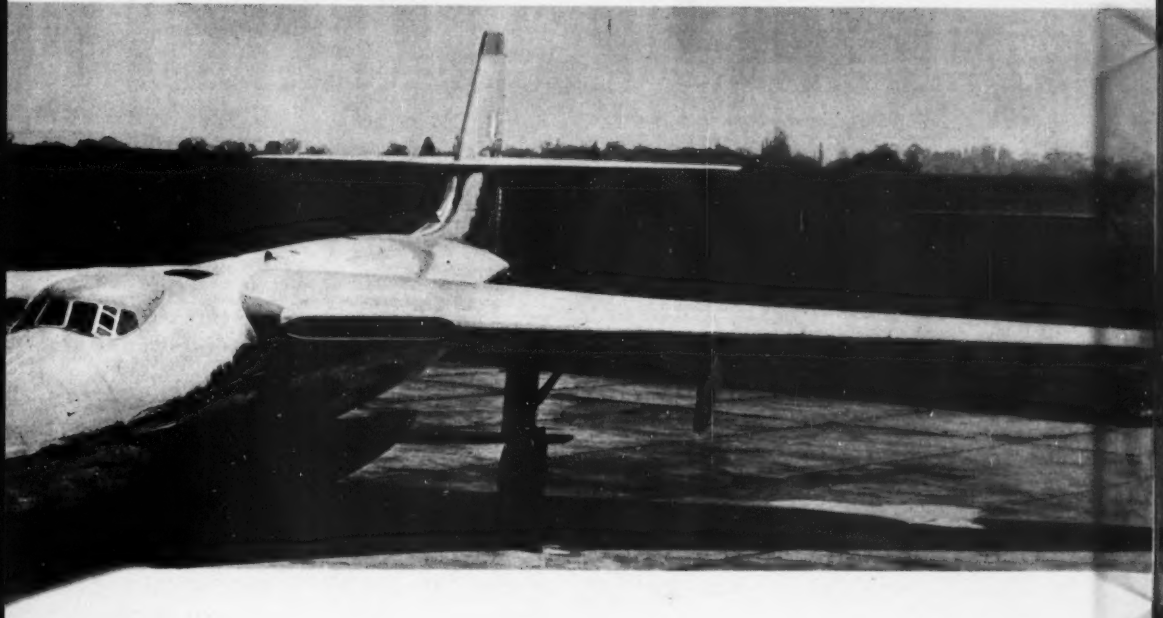
THE FUT

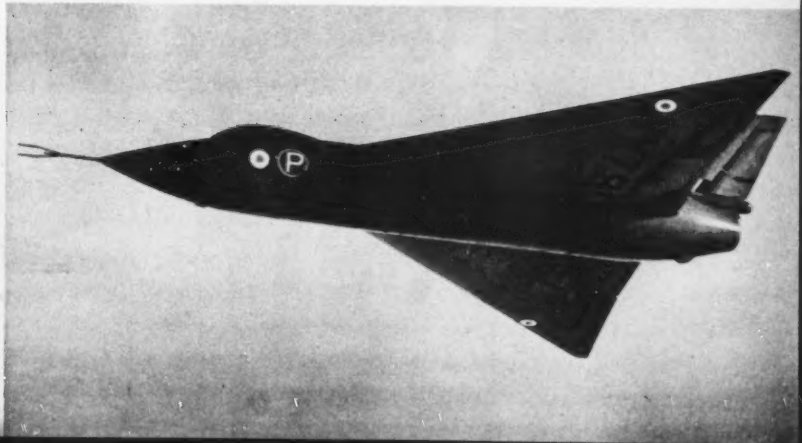
WHILE it is true that the first aircraft to achieve supersonic speed—America's Bell X-1—is of elementary straight-wing configuration, it is now certain that in the immediate future civil and military machines designed to operate in the high-subsonic and transonic regimes will display unorthodox wing forms, as typified here. Both the de Havilland Comet airliner (above) and the Vickers-Armstrongs 660 bomber (right) have moderately swept, heavily-tapered wings of deep root chord. At upper right are the latest (dorsal-finned) version of the Vickers-Supermarine 535 experimental fighter, photographed over the sea, and the Hawker P.1081, both of which have sharply raked wings to permit speeds far in excess of 600 m.p.h. Below, from left to right, are the three British deltas now flying—the Fairey F.D.1, Boulton Paul P.111, and Avro 707B.





URE TAKES SHAPE





Seen over Lagos, Nigeria, this H.P. (Reading) Marathon (four Gipsy Queens) carries West African Airways markings.

The Hawker Sea Hawk is in production for the Royal Navy. Its pleasing appearance can be appreciated in this over-cloud study.

PRELUDE TO PARIS (Cont.)

ELLIOTTS OF NEWBURY, LTD.

MANY continental countries show even greater enthusiasm for gliding than Britain, and no doubt the progress made by such companies as Elliotts of Newbury is watched with interest abroad. A considerable number of Eon Olympia sailplanes (as well as primary and other gliders) have been built, and these have captured many British records—ten in all.

Eon Olympias have attracted many foreign buyers, and some 45 have now been delivered abroad. Countries involved are: America, Canada, Iceland, Norway, Denmark, South Africa, India, Pakistan, Australia, New Zealand and Palestine.

Address: *Albert Works, Newbury.*

THE ENGLISH ELECTRIC CO., LTD.

THE success of the Canberra twin-Avon bomber, designed by Mr. W. E. W. Petter, has forced publicity upon the otherwise retiring (so far as aviation is concerned) manufacturing company. Until other larger jet bombers can be produced and put into service, a tremendous responsibility will rest upon the Canberra, and many and varied duties may come its way. Large numbers are to be built by the parent firm and under sub-contracts, and, perhaps even more important to its future service, as a result of a licensing agreement Canberras will also be produced in America under the designation Martin B-57A. Australia is preparing to build Canberras and Rolls-Royce Avon turbojets for them. (A Nene-powered prototype is also flying in England.)

Address: (*Aviation Division*), *Preston, Lancs.*

THE FAIREY AVIATION CO., LTD.

AMONG the few types of British aircraft to see action since the late war is the Firefly, which has operated with outstanding success and reliability from the carrier *Theseus* in Korean waters. The latest variant, recently announced as an interim anti-submarine machine for Naval Aviation is the Mk 7 three-seater. Following the Fireflies—a production order having been given—is the Fairey 17 with Double Mamba turboprop, large bomb bay, scanner "dustbin" and three-seat layout. This aircraft flies economically on either one of its pair of Mambas, and one, incidentally, can be used to start the other. Thoughts change rapidly on the subject of anti-submarine specifications. The "17," offers the pilot—forward in his *monoposto* cockpit—an excellent view and behind him are two radar operators.

Duplicated power flying control as produced by H. M. Hobson.

Recently, the company announced the successful first flight of a delta-wing research aircraft. A photograph appears on page 706.

Exports of Fireflies have been permitted to Holland, Sweden and Denmark.

Address: *Hayes, Middlesex.*

At Paris: *Stand No.* 136. Representative: *Le Marquis de Ravenel, Société Worldmarket et Cie, 19 rue 4 Septembre, Paris II.*

FOLLAND AIRCRAFT, LTD.

WELL known in the aviation industry, the name of Folland has not, however, been associated recently with any aircraft type but rather with much valuable research and development work and with sub-contract production. Mr. W. E. W. Petter, designer of the Canberra, recently joined the company.

Address: *Hamble, Southampton, Hants.*

GLOSTER AIRCRAFT CO., LTD.

ONE of the mainstays of R.A.F. Fighter Command and of the fighter squadrons of several Western Union powers is the Gloster Meteor. The Marks 3, 4, 7 and 8 need no introduction, and the 9, 10 and 11 for armed fighter reconnaissance, unarmed photo-reconnaissance and night fighter duties respectively, are all now coming into service with the R.A.F. Much favourable comment has been occasioned by the company's P.V. tactical ground-attack Meteor. The Royal Australian Air Force is operating Mk. 8s in the Far East, and from these much in the way of operational experience should be forthcoming. Earlier Meteors were, of course, the only jet fighters to operate for the Allies in the war.

Export licences have been granted for Meteors to be supplied to Holland, Belgium, Denmark, France, Australia and the Argentine. Licence to build them in Holland was also granted some time ago, and assembly has commenced at Schiphol.

Address: *Hucclecote, Gloucestershire.*

At Paris—Representative: *Société Commerciale et Industrielle, Franco-Britannique, 48 Avenue Raymond Poincare, Paris 16e.*

HANDLEY PAGE, LTD., AND HANDLEY PAGE (READING), LTD.

ALTHOUGH the name of Handley Page is associated with heavy bombers as much as with civil airliners, no operational aircraft has as yet been announced to uphold the o/400-Halifax tradition. The main company has recently delivered a series of 40/74-seat Hermes IVs to B.O.A.C., and these are beginning to give good service on the Africa routes. Additionally, the improved turboprop-powered Hermes V is under active development (recently it visited Orly). The related Hastings is serving as a transport with the R.A.F., and it may be recalled that the earlier Halifax is in service with the French Air Force.

At Reading, the Marathon I—a small 18/22-seat four-engine

A variant of the Percival Prince (two Alvis Leonides) for aerial survey. "Flight" photograph

Defence of the Western Approaches

Long range, land based Shackletons of Coastal Command sweeping the Western Approaches provide a constant menace to submarines or surface raiders threatening convoys. The Royal Air Force has chosen the Avro Shackleton for its low level manoeuvrability and its formidable defensive and offensive armament — for its ability to carry great loads to extreme ranges and because its four engines and spacious layout give it greater safety and comfort factors for long ocean patrols.

AVRO *Shackleton*

A. V. ROE & CO. LTD. MANCHESTER Member of the Hawker Siddeley Group

By far the easiest and most comfortable way of

crossing the frontiers of European countries is

to fly over them by BEA; and arrive where

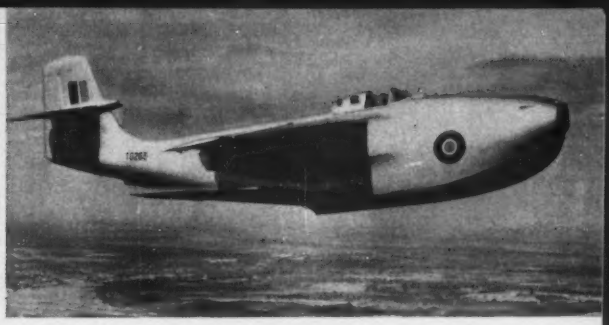
you want, when you want.

fly BEA

BRITISH EUROPEAN AIRWAYS

"Flight" photograph

Recently selected to become the new R.A.F. basic trainer, the Percival P.56 Provost has an Alvis Leonides power unit.



The Saunders-Roe S.R/A.1 twin-jet fighter flying-boat has many unique qualities—some as yet scarcely appreciated.

"I.C.A.O." airliner—is in production for B.E.A. Experience is also being gained with this type in Africa.

During the last year or two export orders have been received by Handley Page from New Zealand. Reading has supplied spares to many parts of the world.

Address: *Cricklewood, London, N.W.2* and *The Aerodrome, Woodley, Reading, Berks.*
At Paris: Representative: *M. F. C. Nestler, 22 Bld. Goucron St. Cyr, Paris, 17e.*

HAWKER AIRCRAFT, LTD.

SOME highly promising fighter prototypes have been produced during the last few years by the Hawker company, and these, each one similar to, but more advanced than, its predecessor, are believed to be leading to a new fighter for the R.A.F. In the meantime the Sea Hawk has been developed as an offshoot, perfected, and is now in production for the Navy. Of very pleasing appearance, the straight-winged Sea Hawk is in the 600 m.p.h. class, with Nene power, and will be a most welcome addition to the Navy's range of fighters.

Among the last of the piston-engined aircraft to remain in first-line service are the Sea Fury and Tempest, both of which are serving with British Services abroad and also in foreign air forces.

Post-war exports of military aircraft have been authorized to Holland, Pakistan, India, Iraq and Egypt.

Address: *Canbury Park Road, Kingston-on-Thames, Surrey.*
At Paris: *Stand No. 28.* Representative: *G. Morel, Société Commerciale et Industrielle Franco-Brittannique, 48 Avenue Raymond Poincaré, Paris, 16e.*

H. M. HOBSON, LTD.

FOR anyone with a practical turn of mind, the Hobson exhibit at Paris will be of especial interest, incorporating as it does a working model of the duplicated cockpit control box with braking airscrew control and engine overspeed safeguards. Special attention is being paid at this time to fuel control units for gas turbine engines. Among other products of the company which are also to be shown at Paris are carburettors and injectors, most of which are of the latest types now serving in the air, and powered flying controls, an example of which is illustrated on the previous page.

Address: *Hobson Works, Fordhouses, Wolverhampton, Staffs.*
At Paris: *Stand No. 42 Grand Nef.*

LODGE PLUGS, LTD.

GREAT reliability under extreme operating conditions is expected of sparking plugs, and the Lodge company have designed in addition to their primary products a number of special testing machines for them. At Paris a range of Sintox insulated aircraft plugs will be shown, and with them examples of testers—for hot leaks at 200 deg C and 600 lb/sq in, and for spark (examined visually) and leaks at normal temperatures and 100 lb/sq in.

A working model demonstrating start and relight plugs for gas turbines is being demonstrated at Paris.

Address: *Rugby.*
At Paris: *Stand No. 46.*

MARTIN-BAKER AIRCRAFT CO., LTD.

THE greatest compliment that can be paid to the Martin-Baker company is to say that though scarcely ever used, pilots trust the ejector seat and are confident that if need be it would help them out of trouble. Of necessity rather bulky, but nevertheless widely used at home and abroad, the Martin-Baker seat has been put through an exacting series of tests and has not been found wanting.

Address: *Higher Denham, near Uxbridge, Middlesex.*

D. NAPIER AND SON, LTD.

THE name of Napier was among those of the earliest and most successful aircraft engine manufacturers, and the remarkable war-time 24-cylinder Sabre is still flying. The company has also designed, built and run a small turboprop since the war, but is at present devoting its entire attention to new designs, the nature of which is confidential. It has been announced, however, that a compounded engine called the Nomad is under development. Napiers are also preparing to build Rolls-Royce Avons.

Address: *Acton, London, W.3.*

PERCIVAL AIRCRAFT, LTD.

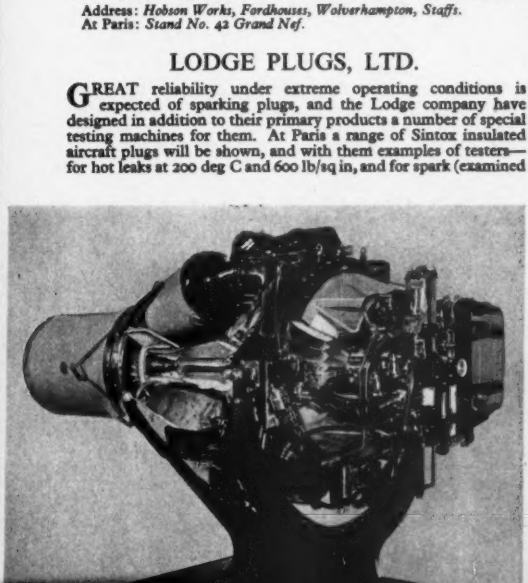
AT the Luton works of the Percival company there is great activity in view of the many new orders received for Princes and the acceptance of, and order for, the P.56 basic trainer. The P.56, which has a 500 h.p. Leonides engine and side-by-side seating, represents the latest thinking in regard to R.A.F. basic training requirements. Heavier and more powerful than earlier trainers in this category, it carries full blind-flying and radio equipment but is nevertheless very lively and fully aerobatic.

Also using Leonides power, the Prince two-engined feederliner is offered as well in crew trainer and survey form. The survey variant differs slightly in outward form but can be quickly convertible for passenger (8) and freight work in addition to survey and photographic duties. The Royal Navy's crew trainer variant is known as the Sea Prince.

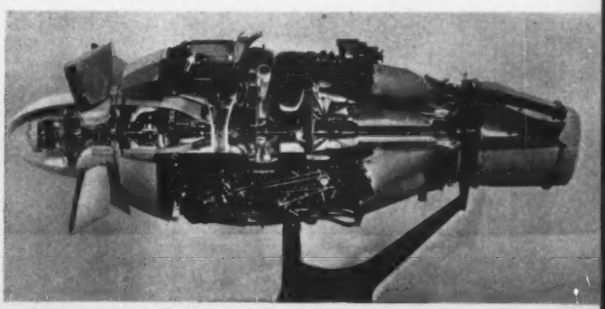
Prentices are being manufactured at the Hindustan Aircraft factory at Bangalore.

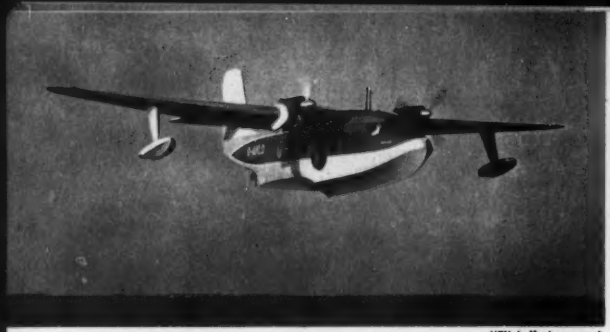
Exports, including Proctors and Prentice trainers as well as Princes so far completed, have been delivered to the following countries: Australia, Argentina, Belgium, Belgian Congo, Brazil, Canada, Egypt, France, Syria, Transjordan, Venezuela, India, Iraq, Lebanon, New Zealand, Northern Rhodesia, Portugal, South Africa, Sweden, U.S.A. and Borneo.

Address: *Luton Airport, Bedfordshire.*



Widely used in the many marks of Meteor, the Rolls-Royce Derwent turbo-jet (Left) is being built both at home and abroad. Rolls-Royce Dart turboprops will soon see service over Europe in B.E.A.'s Viscounts.





"Flight" photograph

The Leonides-powered Prestwick Pioneer has a remarkable take-off and landing performance. (Left) A pleasing study of Short's shapely Sealand flying-boat amphibian (two Gipsy Queens).

PRELUDE TO PARIS . . .

A. V. ROE AND CO., LTD.

KNOWN to all in wartime for their Lancasters and Ansons, A. V. Roe have recently come into the limelight again with turbojet research aircraft of delta configuration (Avro 707) while continuing with the four-jet Ashtons for high-altitude research and maintaining the Lancaster-Lincoln line with the Shackleton, now beginning to equip the R.A.F.'s long-range coastal reconnaissance squadrons. It is learned that handling trials with the delta aircraft have been giving most promising results.

The Shackleton is considerably larger than the Lancaster, and for patrols and submarine hunting—sorties of very long duration—crews need the increased space, comfort and equipment it provides in order to carry out their duties with maximum efficiency. The four engines are Rolls-Royce Griffons, driving contraprops.

The latest version of the perennial Anson trainer continues to give good service.

Since the end of the war exports have amounted to £7¼ million, including spares, and the countries concerned are Afghanistan, Argentine, Australia, Belgium, Burma, Canada, Egypt, Eire, Ethiopia, France, India, Portugal, South Africa and Sweden.

Address: *Greengate, Middleton, Manchester.*

At Paris: *Stand No.* 28. Agent: *Société Commerciale et Industrielle Franco-Britannique,* 48 *Avenue Raymond Poincaré, Paris* 16e.

ROLLS-ROYCE, LTD.

THIS company can justly claim that its name has become an international adjective indicative of the highest quality and today its aircraft gas turbines maintain the standard of "R.-R." excellence. The Paris salon will have the distinction of presenting the Avon for the first time in public and with this immeasurably important military (and civil) axial turbojet will be shown the Derwent and the Dart turboprop. Very-large-scale production of Avons—for the Canberra in particular—is planned in Great Britain, and a licencing agreement has been negotiated with Australia, where Nenes are already being produced. The Avon has a specific consumption at maximum continuous power rating of 0.865 lb/hr/lb.

The Hispano-Suiza company, will, at Paris, show a Nene as produced under licence in France. Belgium and the Argentine hold licences to build Derwents. Few direct exports have been authorized since the war, though some years ago (and as it has turned out, misguidedly) a government decision led to the delivery of a number of early centrifugal units to Russia where they are believed to have been put to very good use. Most important of the foreign agreements is that with the Pratt and Whitney company of America who are producing and developing the Tay.

Address: *Nightingale Road, Derby.*

At Paris: *Stand No.* 33 *Grand Nef.*

SAUNDERS-ROE, LTD.

MARINE aircraft have always been the forte of Saunders-Roe, and the company is now engaged on the construction of ten-engined Princess flying boats and the S.R/A.1 twin-jet fighter flying boat. The Princess, which should begin its flight trials this year, measures over 219ft in span, and will weigh about 140 tons. A still-air range of 5,500 miles and a maximum cruising speed of 380 m.p.h. are forecast. The present S.R/A.1 fighter is capable of over 500 m.p.h. and has demonstrated an extraordinarily high standard of manoeuvrability.

Saunders-Roe have taken over the development of the Skeeter (Cierva W.14) two-seater helicopter. This attractive little aircraft is in future to have a 180 h.p. Blackburn Cirrus Bombardier engine.

The Slingsby T.34 Sky sailplane, latest of its line, an example of which is displayed in the Festival of Britain Exhibition.

The company has lately taken over the development of Cierva helicopters, particularly the W.14 Skeeter two-seater with 180 h.p. Cirrus Bombadier engine.

Address: *Osborne, East Cowes, Isle of Wight.*

SHORT BROTHERS AND HARLAND, LTD.

OF particular interest to Paris visitors is the Short Sealand flying-boat amphibian, which has now undergone extensive trials at home and overseas. Compact and attractive, it has a good performance on the power of two Gipsy Queen 72s. The company's other activities are mainly confined to the military field now that the large flying boats—in particular the popular Solents—are no longer their direct concern. Sturgeon T.2 target tugs are being delivered in small numbers, and development of the Mamba-powered S.B.1 anti-submarine aircraft continues. The name of

(*Concluded on page* 711)

The Viscount 700—most comfortable of airliners—is eagerly awaited on European routes. Power is supplied by four Rolls-Royce Dart turboprops.
"Flight" photograph

Latest Westland-Sikorsky product is the S.55, due to be demonstrated in England for the first time to-day. The engine is a Pratt and Whitney Wasp.

The
MARCEL DASSAULT

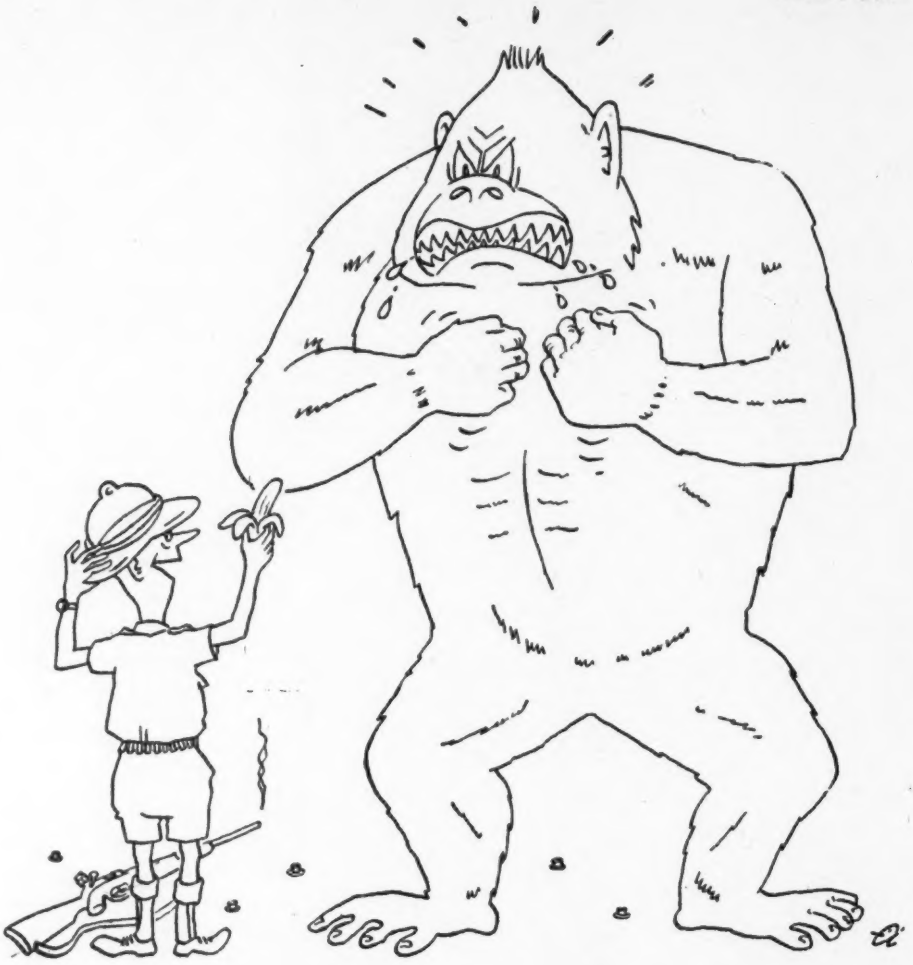
Ouragon

and other French
aircraft are fitted
with the-

MARTIN-BAKER

Ejection Seat

MARTIN
-BAKER
AIRCRAFT CO. LTD HIGHER DENHAM NEAR UXBRIDGE MIDDLESEX ENG



Don't take *unnecessary* risks

SALTER
for SAFETY

Est. 1760

It's always dangerous to 'monkey' with quality, and no manufacturer will take unnecessary risks with components; it is an axiom that one gets precisely what one pays for. In the long run it's far more costly to buy cheap parts, even though high quality parts cost more initially; and though SALTER Springs may be higher in price than some others, they are so, merely because the emphasis is always on Quality. With this we take no risks, and feel sure your policy will be the same — to *both* of us UNNECESSARY risks are far too expensive.

GEO. SALTER & CO. LTD., WEST BROMWICH

s-w.289

PRELUDE TO PARIS...

Short, borne by the war-time Stirling, has again been associated with a new bomber, and it may be assumed that the company's enthusiasm for large flying boats is being maintained.

Short products have been exported to : South Africa, Norway, New Zealand, Australia and the U.S.A.

Address: *Queens Island, Belfast, Northern Ireland.*

At Paris: Representative: *M. Stern, Avio Star, 27 Avenue de la Grand Armée.*

SCOTTISH AVIATION, LTD.

A COMPANY with many interests, Scottish Aviation has over a period developed the Leonides-powered Prestwick Pioneer, which is capable of operating from very confined spaces. Its specialized qualities, conferred chiefly by the large-area, much-flapped-and-slotted wings, may enable it to tackle work among the small rocky islands off the Scottish coast. Three Pioneers have been ordered by the British Ministry of Supply for observation and communications on the Australian Woomera rocket range.

Scottish Aviation specializes also in conversion and repair work, and is at present engaged on B.E.A.'s Pionair Dakota conversions.

Exports have been averaging a figure of £400,000 annually. The countries concerned are : U.S.A., Holland, Denmark, Norway, Sweden, Belgium, Switzerland, Portugal, Iceland, India, South Africa, France, Syria, Cyprus, Australia, Ceylon, Greece, Eire.

Address: *Prestwick Airport, Ayrshire, Scotland.*

SLINGSBY SAILPLANES, LTD.

GREAT interest has been aroused by the newly introduced Slingsby T.34 or Sky high-performance sailplane, examples of which are now being prepared for the British National Gliding Competitions at Camphill, Derbyshire. Dimensions and performance figures are given on page 722. A full blind panel is standard equipment, and provision is made for oxygen.

Another important product of this company, known to the R.A.F. as the Sedbergh, is the T.21B dual trainer.

Slingsby have been exporting at the rate of £10,000 each year. Receiving countries are : Sweden, Portugal, Pakistan, India, New Zealand, Australia, S. Rhodesia, South Africa and Holland.

Address: *Kirbymoorside, Yorkshire.*

VICKERS, LTD.

VICKERS-ARMSTRONGS, LTD., have in current production the Viscount 700 airliner (powered with four Rolls-Royce Dart turboprops and already famed for its exceptional standard of passenger comfort), the Valetta military transport, and Varsity crew trainer. Latest product, now ordered for R.A.F. re-equipment, is the Type 660 bomber, powered by four Rolls-Royce Avon turbojets buried in the inboard wing sections. This is altogether a most impressive aircraft, and is probably the most effective four-jet bomber in the air today. Incidental items in which the company specializes include seats and fuel accessories.

The Vickers-Supermarine branch has lately received a production order on behalf of the R.A.F. for its Swift fighter, a development of the very fast experimental swept-wing type 535. The 535 was itself developed from the straight-wing Attacker, now being delivered to the Royal Navy and to Pakistan.

Vickers have exported to the following countries : Argentine, Australia, Belgium, British West Indies, Denmark, Eire, Egypt, France, French Indo China, Holland, India, Iraq, Pakistan, Rhodesia, Siam, South Africa, and Sweden.

Address: *Aircraft Division, Weybridge, Surrey.*

At Paris: *Stand No. 34 Grande Nef.* Representative: *Marcel Lourde 36 Avenue Hoche, Paris 8.*

WESTLAND AIRCRAFT, LTD.

HELICOPTERS (S-51 and S-55) and the Wyvern strike fighter are the primary products of this West of England company. The S-55 has a normal gross weight of 6,800 lb, a disposable load of 2,405 lb, and a normal operational range in excess of 400 nautical miles. Varied military and civil applications are foreseen, including anti-submarine duties. The Wyvern is a large deck-landing torpedo-carrying, high-performance, single-seater, powered by an Armstrong Siddeley Python turboprop. Since the war Westland products have been exported to Egypt, the Belgian Congo, Italy and Thailand.

Address: *Yeovil, Somerset.*

At Paris: *Lt.-Col. Gaussault, 48 Avenue Raymond Poincaré, Paris 16.*

ENGINEERING IN AVIATION

Four Aeronautical Papers read at Joint Conference of three Learned Societies

OPENED on June 4th by Mr. Richard Stokes, Lord Privy Seal, the Joint Engineering Conference of the Institutions of Civil Engineers, Mechanical Engineers and Electrical Engineers embraced the presentation of a notable variety of papers covering many aspects of the specialized engineering interests of the three learned bodies concerned. Aviation matters were first discussed in the paper, *The Application of Power to Aircraft*, presented at the Institution of Mechanical Engineers on June 8th by Mr. F. M. Owner, C.B.E., M.Sc., chief engineer, Engine Division, Bristol Aeroplane Co., Ltd.

MR. OWNER opened his paper with an historical survey of propulsion and accessory power requirements, and then went on to dilate upon current practice. Of the choice of propulsive system, he stated that the airscrew was accepted as the best mode of propulsion for speeds up to 500 m.p.h. and altitudes up to at least 40,000ft, but that, beyond these values, the turbojet had as yet no competitor. However, the piston engine continued to be accepted as suitable for transport aircraft (civil or military) having speeds up to 300 m.p.h. and at altitudes up to 20,000ft. For very long duration, compounding would come into use, but the improved fuel consumption now achieved by the larger axial-flow turbojets considerably lengthened the duration and range available. Present trends showed no sign of any practical limit to the size of turbojets comparable with the cooling problem which limited the cylinder size of a reciprocating engine. Nevertheless, an economic limit would be reached as soon as increase of power could be obtained only by direct scaling of every component and dimension, for specific weight would then start to increase. The size at which this limitation would occur had not, however, yet been determined.

After giving brief descriptions of various representative power installations, the lecturer went on to consider accessory power. For large aircraft, the counterbalancing of control surfaces had now reached its limit, and the use of mechanical power for moving the control surfaces was thus encouraged. The power required was appreciable (say, 50 h.p.) for a large aircraft, and although intermittent, was needed several times a minute from take-off to touch-down. The long runs now required for engine and airscrew controls also made power actuation necessary to maintain precision of operation under all conditions.

In connection with the mechanical actuation of landing gear, Mr. Owner stated that the power requirement was about 1 h.p. per 10,000 lb of aircraft weight, and went on to say that, although the flying boat had no undercarriage, it only partly escaped the additional power requirement, in that present-day speeds demanded retraction of wing-tip floats : these, however, needed only a fraction of the power required for the landplane's undercarriage. The enormous advances in the field of radio and navigational aids had increased the power requirement to a point where 2-4 kW were essential for long-distance all-weather aircraft. Alternating current was needed at a controlled frequency, and unless auxiliary power units were carried, a rotary convertor or variable-speed hydraulic transmission was necessary.

Of engine de-icing, the lecturer stated that there was much argument over the relative merits of the solutions now applicable to gas turbines. Both power and heat were available in large quantities under normal conditions, but de-icing had to be possible when engine output was low, as in prolonged glides. Continuous electrical heating was convenient but wasteful, as its efficiency was appreciably lower than the thermal efficiency of the engine, which wasted more than two-thirds of the fuel heat. It was therefore less extravagant to heat the intake walls and, if necessary, the first few blade rows by bleeding air from the compressor delivery or gas from the jet-pipe. In the turboprop engine, the jet-pipe pressure might be insufficient when the output was low, but this difficulty could be obviated in the free turbine by tapping gas between the compressor-driving and power sections of the turbine. A much larger quantity of heat was required for wing de-icing, and although this could be obtained from the engine in the same way, heat exchangers had

ENGINEERING IN AVIATION...

to be used because it was undesirable to introduce combustion products into the wing, owing to the danger of severe corrosion on condensation. Electric de-icing could be both efficient and light, because current could be used cyclically as, indeed, it was in the case of airscrew blade de-icing.

The services embraced in the function of cabin atmosphere control cost about 1 h.p. per person for pressurization, and up to 0.5 h.p. for refrigeration. With a gas turbine power installation, it was attractive to tap the compressor, as the necessary pound of air per person per minute amounted to less than 1 per cent of the gas turbine mass-flow, and the effect on compressor/turbine matching was small. However, there were disadvantages: (i) no trace of oil must leak from the compressor bearings into the airflow; (ii) the range of engine speed was limited by the need to maintain adequate pressure at the tapping; (iii) the use of methanol for de-icing or power boosting was precluded; and (iv) if combustion gases were used for de-icing, they had to be sealed off from the compressor airflow. For these reasons, it had been considered advisable in some cases to use separate cabin superchargers.

Lighting and galley services were included in the cabin services group. Lighting required up to 1.4 kW on aircraft of 60,000 lb a.u.w., and about 6 kW on aircraft of Brabazon size. Galley loads varied between 7 and 12 kW in this size range.

Under the heading of accessory power supply, the lecturer stated that the turbine engine presented new potentialities, not only in the availability of compressed air, but also in the existence of a high-speed drive for an electric generator. These possibilities seemed attractive, but it had to be remembered that compressed air was not free, and if the compressor was robbed of either air or power, the cost might be disproportionate if turbine/compressor matching was appreciably affected. An approximate general rule was that the abstraction of 1 per cent of compressor power for air delivery cost 1½ per cent in power output, and 2½ per cent in specific consumption, but if the compressor or turbine characteristics were sharply critical (as with high compression ratios) the percentage loss was appreciably more. In this connection, however, power could be taken from a free turbine either in the form of hot gas or shaft power, without affecting the compressor matching. The accessory power unit offered undoubted advantages, but entailed penalties of duplication and weight. Interest had recently been re-awakened, however, by the introduction of low-powered gas turbines which, although their specific fuel consumption was inevitably high, nevertheless deserved consideration for short-period applications by virtue of their low weight.

Dealing with future prospects, Mr. Owner stated that the turboprop engine had two exclusive design potentialities: (a) higher combustion temperatures, and (b) high-speed-airscrew development. With regard to (a) the output increased rapidly, and the efficiency steadily, up to any temperature which could be contemplated from present understanding of materials and design. Much work was in hand on both aspects, and the use of blade cooling combined with external coatings would lead to marked advances. As to (b) it had been theoretically indicated, and factually confirmed that, although an airscrew specially designed for supersonic rotational speed was less efficient than a conventional airscrew at flight speeds appreciably below that of sound, it could, nevertheless, retain a fairly high efficiency—about 70 per cent—well into the range of supersonic flight speeds. Mr. Owner suggested that the possible field of utilization of the supersonic airscrew was limited to speeds between Mach numbers of 0.8–1.2 where, however, it might be able to demonstrate a significant improvement in range. It was in this speed region (M 0.8–1.2) that the ducted fan or by-pass engine would find their sphere of utilization, if any.

Development of the turbojet was, the lecturer thought, straightforward. Higher temperatures would improve specific thrust at the cost of increased fuel consumption, both at sea-level and at altitude. The only avenue open for improvement in economy without sacrificing specific output lay in the use of higher compression ratios, for which higher component efficiencies were a prerequisite. Unfortunately, however, both these factors were beginning to reach the region of diminishing returns in respect of specific consumption. At supersonic speeds, high compression ratios were of less advantage, but, fortunately, this was offset by the concurrent improvement in propulsive efficiency.

The very high thrusts required at transonic and supersonic speeds would limit range and duration for a long time to come, and since for short duration specific output assumed increased importance compared with specific consumption, combustion temperatures might well be increased for these duties by the use of blade cooling. This, observed the lecturer, was a method of increasing thrust which was far less extravagant than re-heat; which did not require the complication of a variable-jet nozzle; and which need not interfere with the attainment of good cruising consumption at lower temperatures.

Aircraft Structures

The two aeronautical papers presented on Monday, June 11th, at the Institution of Mechanical Engineers, were *The Development and Design of Aircraft Structures*, by Professor A. G. Pugsley, O.B.E., D.Sc., M.I.C.E., and *Planning and Construction of Airfields*, by Mr. J. A. Dawson, C.B.E., B.Sc., M.I.C.E.

Professor Pugsley, having given an historical review followed by a brief survey of current design, turned his attention to research and the future, and dealt first with the problems of fatigue. One of the difficulties was that too little was known of the loading cycles that occurred in practice, and, in the absence of full evidence, the current British tendency was to concentrate on tests representing a fluctuation of roughly ± 10 per cent about the loads corresponding to level flight, and to aim at the production of materials and structures which would withstand such fluctuations for at least 2×10^6 cycles.

A major problem of construction was the stabilization of the thin metal skin of wing or fuselage for reasons both of strength and aerodynamic smoothness. Interest had been focused on metal sandwich construction, and experiments had been made on a wide range of possible fillers, including expanded formvar and paper honeycombs impregnated with resin. It was now known that sandwich structures of this type could be made having a strength of the order required for wing covering, and a weight of the same order as that of stringer-reinforced plating.

Initially tried out in miscellaneous minor applications, reinforced plastics, particularly those using resin reinforced by asbestos fibres, had since been developed to give strengths and weights of the order required for general use in aircraft construction. Again, the method offered chances of improved surface smoothness and, in addition, had obvious potentialities for large-scale production. Another interesting material was magnesium, and the production of thick magnesium plating of high purity (and therefore with less liability to corrosion) had now become practicable, and experiments were in hand on the possible use of this for the main structures of aircraft. Such thick plating—of the order of half an inch—should be capable of replacing the reinforced sheet of wings or fuselages, and was found to have strength/weight characteristics which might lead to increased efficiency.

Advanced design of aircraft, such, for example, as delta wing and swept wing types, introduced new structural problems. The old concept of wings built around two spars had largely to disappear in delta wings, where "ribs" and "spars" became of almost equal status. Experiments on the natural modes of vibration of such wings had shown that the aero-elastic problems of the future would relate more to those of a delta-shaped "jelly" or of a ship's propeller blade, rather than to the bending and torsional modes of a conventional wing.

Airfield Layout

Mr. Dawson began his paper on the planning and construction of airfields with a reference to the development of grass airfields, and then went on to give a brief description of the growth of hard-runway airfields during the war. In the last 40 years, the area of airfields had grown from about 100 acres or less to more than 1,500 acres in the case of the largest Service stations, and 3,000 acres in the case of London Airport. The cost of preparation of one of the early grass airfields probably did not exceed £5,000, whereas the cost of the largest Service airfields was in the neighbourhood of £2,000,000, and the estimated cost for the present scheme for London Airport stood at about £7,000,000.

The lecturer then went on briefly to describe the development of airfield lighting, and stated that the installation at London Airport was the most advanced arrangement in the U.K.

Mr. Dawson thereafter sketched in the chief factors governing the selection of an airfield site, and then dealt with the respective advantages and disadvantages of the parallel-runway and tangential-runway layouts. On the score of design and construction of airfield pavements, the lecturer emphasized the necessity for having preliminary expert examination of the soil structure. For heavy-duty runways, there had been a tendency to select rigid concrete construction, but this was not necessarily the most suitable form of pavement. The choice of pavement should be governed by the bearing capacity of the sub-grade, within the limitations imposed by the depth of sub-base required over the natural sub-grade. The thickness factor in a cubic content of concrete, which, on a large airfield, might amount to not less than half a million cubic yards, might involve a very large sum of money. For this reason, Mr. Dawson thought that, whilst the Westergaard formulae have been of great value, it was possible that the data now being collected by the Air Ministry might prove to be a more reliable basis for economical design.

On the subject of expansion and contraction joints, it was stated that, although it was normal practice in Britain to provide

expansion joints at distances of not more than 120ft apart, the Americans had used joint distances at least five times this length. In the construction of rigid pavements which, as in the British normal practice, were not reinforced, it was essential to ensure that concrete of the highest quality was provided. Strength, however, had to be combined with adequate workability, so that the concrete could be fully compacted, and be capable of giving the essential smooth surface. At the instant of touch-down, an aircraft wheel had to pass from rest to relatively high speed in an extremely short interval of time, and it was therefore necessary that the runway surface should be smooth, so as to ensure that tyres were not cut at the time of initial contact. Special finishing arrangements, included final smoothing by means of a belt.

Since the war a considerable degree of collaboration had been established between those responsible for aircraft specification and design and those responsible for the provision of airfields.

As a direct result of extensive tests on runway pavements, it had become possible to determine reasonably closely the resultant or equivalent single-wheel loading of multi-wheel assemblies.

Not only was this of value to the airfield engineer in the design of runways to carry specific aircraft loads, but it also provided information which could be used by the aircraft designer in the design of aircraft which had to land on specific airfields. It was probable that existing airfields of the highest class would be capable of carrying the largest aircraft which might be built in the future, because their loads would be so distributed that the resultant stresses on the runway structure would not exceed those of the lighter aircraft for which they had been designed.

Airfields in Great Britain were based on a triangular plan of three runways, but for large modern aircraft capable of landing when the cross-wind component was 25 m.p.h., two runways were sufficient. However, the possibility of a trend towards a reduction in the number of runways depended entirely on developments in aircraft design. There was a tendency to believe today that, for parallel runways used for landings in conditions of low visibility, much greater separation than was previously considered necessary might be essential at civil airports and, in consequence, the use of parallel runways on the same site for this purpose might not be practicable. The decision announced in 1950 to complete the layout of London Airport by the construction of two runways at an angle of approximately 10 deg to the main east-west runways, instead of repeating the triangular pattern of the originally proposed layout, appeared to be indicative of this change of view.

Communications

On Tuesday, June 12th, a paper entitled *Forty Years' Progress in Air Radio* was presented by A. Cdre. C. S. Cadell, C.B.E., M.A., Ing.E.S.E., A.M.I.E.E., and Dr. B. J. O'Kane, Ph.D., B.Eng., A.M.I.E.E.

A.Cdre. Cadell and Dr. O'Kane began with a brief review of the history and growth of aeronautical radio up to the end of the war in 1918. During that time, medium-frequency techniques were developed to the stage of becoming operationally reliable, and foundations of modern direction-finding were laid. After the First World War, civil aviation began slowly to develop, and there was a progressive speeding up of all forms of activity in the radio field up to 1939. Among many important developments were the use of H.F. signalling, the introduction of very high frequencies, and an increased use of radio navigational aids. No attempt was made to set out the advances achieved during the Second World War, but attention was drawn to the use of pulse techniques for many purposes. Although there had been no major advances in telecommunications systems since the war, new types of equipment had been introduced which showed marked technical and operational advantages.

The paper then gave a brief survey of the present situation in the communications, navigational aids and power supply fields, summing up with the statement that there was much air radio equipment of war-time design still in use. However, post-war equipment, particularly in the field of communications, showed marked technical progress, especially where frequency channels were concerned. Economy in size and weight had been notable, whilst excrescences outside the aircraft were being suppressed. Reliability and ease of handling had assumed new importance. At first sight, the paucity of standards agreed by I.C.A.O. might seem disappointing. However, I.C.A.O. had in fact achieved a great deal. International legislation had to take many factors into account; it lacked powers of compulsion and had to be supported by a large measure of general agreement. The pace had, therefore, to be deliberate.

Of future developments, it was stated that the existing air traffic control system worked adequately for today, but it depended for its operation on a number of manually controlled processes, and could not be said to be foolproof. This state of affairs, however, could not long apply. The performance of jet aircraft, and the peculiar demands made by this type of aircraft, made it clear that the air traffic control system necessary for congested areas would require to be modified very considerably. It had to be remembered, however, that there would still be medium-speed piston-engined aircraft in use—to say nothing of the helicopter—and whatever control system was adopted would have to deal with great disparity in speeds. It was surely a logical conclusion that as much of the control work as possible should be done automatically, leaving a controller free to supervise and intervene in emergency.

In the opinion of the authors, the following principles would be generally accepted as a basis for further progress:

In an area of traffic density there would have to be a single authority in control of all aircraft. To fulfil this task, the control centre would have to have presented to it the three-dimensional position of every aircraft in the area; these aircraft to be in communication with, and identifiable by, the control centre while in the prescribed area.

Human processes had to be eliminated where possible and human error checked by electro-mechanical means. As a result of this, safe separation between aircraft would have to be ensured—each being allotted sufficient space in which to manœuvre.

Aircraft in areas of high traffic density would have to travel on definite pre-arranged routes, although these routes might well have to be dog-legged and not straight lines.

The limiting factor in the movement of aircraft was that of the slowest processes—at present the frequency of final approach. If regularity was to be assured, this frequency would have to be stepped-up to the normal rate under visual conditions.

All equipment had to fail safe.

In the British Empire, the need for providing for the less busy terminals with their simpler traffic patterns had to be borne in mind. Their organization had to be able to fit into the general scheme without their having to assume unnecessary complications.

The authors commented briefly on the report of the (American) SC 31 Committee, and observed that the most interesting points of the report—so far as their paper was concerned—were (i) that the SC 31 report looked forward to a "block" system of signalling—analogous to that of the railways; (ii) that each aircraft was permitted a space five miles square by 1,000ft deep in which to manœuvre; and (iii) that automatic flying control and automatic landing were envisaged at some future date. The authors felt, however, that it should be possible to get the same degree of safety with less elaborate equipment, at least in the less-congested zones.

They assumed that a congested area would normally be covered by a "carpet" of ground radar equipment continuously reporting the position and height of aircraft. The aircraft would carry a transponder which, when interrogated, would give the aircraft's identity and, possibly, other information, such as height. V.H.F. D/F would act as a check as well as being used to identify those aircraft whose transponders were unserviceable. An automatic computer at the control centre would compare the aircraft's three-dimensional track with the "ideal" track for the selected lane, and would signal course automatically to the aircraft. A further function of this machine would be to give warning of impending collision and to record all messages passed. The airways would, as at present, be divided in sections, which would be indicated by ground beacons, with fan markers as standby, and aircraft would not be permitted to pass into the next section without receiving the all-clear from the control centre.

However, to replace the controller's brain by an automatic computer was not enough. Information would need to be passed to the aircraft rapidly and intelligibly without the use of speech: it should not be necessary except in emergency to take up time and a band-width by giving verbal instructions. In general, these instructions would be such that an impulse signalling system already well known (Gates, 1947) could handle them.

From the point of view of the aircraft, the captain would need first to file his flight plan; if accepted, he would thus obtain the right to land at a specified time. When approaching the control zone, he would seek permission to enter, at the same time confirming his routing instructions. Once in the zone, he would fly on the pre-determined track and altitude, using the approved short-range navigation system which all aircraft in the area would be obliged to carry. He would receive corrections to his course automatically or by radio-telephony from the control. An aircraft would, on occasion, be held in one or other of the sections, but if all went smoothly, it would go from section to section, receiving instructions when to change to the airfield frequency for final approach.

Under this system the aircraft would be required to carry the approved short-range navigational aid, the V.H.F.-impulse-telephony transmitter-receiver, and a transponder. In addition, a landing aid would be required, and a long-range aid would be necessary on certain routes. Large aircraft would probably carry primary radar equipment, in which ground beacon signals could also be displayed for navigational purposes. Two or more of these facilities might possibly be combined in one equipment.

BIRTHDAY HONOURS

Awards to the R.A.F. and Members of the Aircraft Industry

Mr. J. R. Young (Knight)

Mr. G. W. H. Gardner (C.B.E.)

Air Chief Marshal Sir Wm. Elliot (K.C.B.)

BELOW are names of those in the Royal Air Force, the aircraft industry, and the Ministries concerned with aviation, who are named in the Honours List published on the occasion of the King's Birthday last Thursday.

In a forthcoming issue we hope to list additional Honours, including M.B.E.s (civil); Commonwealth Air Force honours and awards; and Air Force Medals and other awards made in the Royal Air Force.

KNIGHTS

Lt.-Gen. J. F. Evetts, head of U.K. Ministry of Supply staff in Australia.

J. R. Young, director, Vickers, Ltd., and Vickers-Armstrongs, Ltd.

ORDER OF THE BATH

C.B.

H. R. Camp, Under Secretary, Ministry of Supply.

ORDER OF THE BRITISH EMPIRE

K.B.E.

A. S. Le Maitre, Controller of Ground Services, Ministry of Civil Aviation.

C.B.E.

A. Cdre. R. Cadman, vice-chairman, Territorial and Auxiliary Forces Assn. of the County of Glamorgan; H. T. Chapman, managing director, Armstrong Siddeley Motors, Ltd.; G. W. H. Gardner, Director of Guided Weapons Research and Development, Ministry of Supply; Prof. A. B. Hill, Consultant in Medical Statistics, R.A.F.; V. A. G. Lambert, Director-General of Armament Production, Ministry of Supply; W. E. W. Petter, deputy managing director, Folland Aircraft, Ltd.; W. J. Taylor, member of Air Cadet Council and chairman of committee, No. 148 (Barnsley) Sqn., A.T.C.

O.B.E.

C. P. Ackers, for services to discharged airmen; W. J. Cozens, superintending civil engineer (Grade II), Air Ministry; G/C. J. Cunningham, chief test pilot, de Havilland Aircraft Co., Ltd.; R. Frith, principal scientific officer, Air Ministry; H. E. Hancocke, assistant Director-General of Aircraft Supplies, Ministry of Supply; S. R. Howes, director and general manager, Samuel Fox and Co., Ltd.; D. Llewellyn, chairman, Bournemouth Wing Committee, A.T.C.; H. J. N. Mattock, Assistant Director of Contracts, Air Ministry; L. C. Nash, principal, Ministry of Civil Aviation; Capt. J. Rudd, senior capt., 2nd class, B.O.A.C.; J. W. Wilkinson, lately chief armament designer, Vickers-Armstrongs, Ltd.

O.B.E. (Honorary)

Commandant H. Roth, Chairman of Flying Personnel, Madagascar region, Air France.

ORDER OF THE BATH (MILITARY)

K.C.B.

Air Chief Marshal Sir William Elliot, Air Chief Marshal Sir George Clark Pirie, Air Chief Marshal Sir Hugh Pughe Lloyd.

C.B.

A.V-M. T. G. Bowler, A.V-M. N. H. D'Aeth, A.V-M. S. D. Macdonald, A. Cdre. O. W. de Putron, A. Cdre. A. McKee, A. Cdre. W. Wynter-Morgan.

ORDER OF THE BRITISH EMPIRE (MILITARY)

K.B.E.

Air Marshal Ronald Ivelaw-Chapman, Air Marshal J. N. Boothman.

C.B.E.

A.V-M. W. E. Barnes, A.Cdre. Hugh Hamilton Brookes, A. Cdre. J. D. Baker-Carr, G/C.s D. I. Coote, J. Jefferson, W. M. C. Kennedy, E. L. G. Le Dieu, M. F. D. Williams.

O.B.E.

G/C. A. A. Newbury, W/C.s K. H. Gooding, F. D. Luke, C. B. Millett, C. D. Milne, B. G. Morris, D. J. Sherlock, R. H. Smith, H. Stringer, J. H. Woffindin, F. M. Osborn, G. A. Potter.

S/L.s R. W. Adams, H. R. Hall, A. S. Harman, K. Holden, C. H. Leese, W. Norrie.

M.B.E.

W/C.s A. S. Dodd, D. G. Smallwood.

S/L.s R. Fernie, R. J. Mitchell, G. W. Spiers, J. J. Tynan, J. A. West.

F/L.s H. Berry, I. B. Clark, A. K. Edwards, K. Gierzod, W. Hannant, C. L. G. Puncher, P. Smith, J. H. Smyth, J. E. Tompkins, W. E. Wiseman.

F/O. C. G. Lilley.

W/O.s W. Biggins, H. Dyche, F. G. Ferris, G. Hicks, H. G. W. Howell, P. J. Ingram, I. J. Leek, A. Meller, C. H. O. Pearce, A. P. Rees, L. S. Way, E. Young, L. H. Withers.

ROYAL AIR FORCE AWARDS

BAR TO AIR FORCE CROSS

W/C. T. G. Mahaddie, F/L. P. D. Thorne.

AIR FORCE CROSS

S/L.s P. R. Casement, L. H. Cherry, J. C. T. Downey, G. Gray, E. D. Pennington, D. S. V. Rake, A. E. Callard, J. R. Robinson, R. Horace Smyth, G. W. Vowles.

F/L.s S. J. Andrzejewski, H. Bennett, R. J. Brain, A. G. Brown, A. Campey, D. Dattner, B. D. B. Lewis, S. M. Mackay, J. K. Maddison, W. P. Peedell, B. G. Roberts, A. J. Sharman, J. A. Simpson, W. H. W. Spencer, R. R. Waughman, R. K. Wilson.

M.Plts W. Grobelny, B. W. T. Horn.

Cdr. P. S. Wilson, R.N., Lt. (A) J. Elliot, R.N.

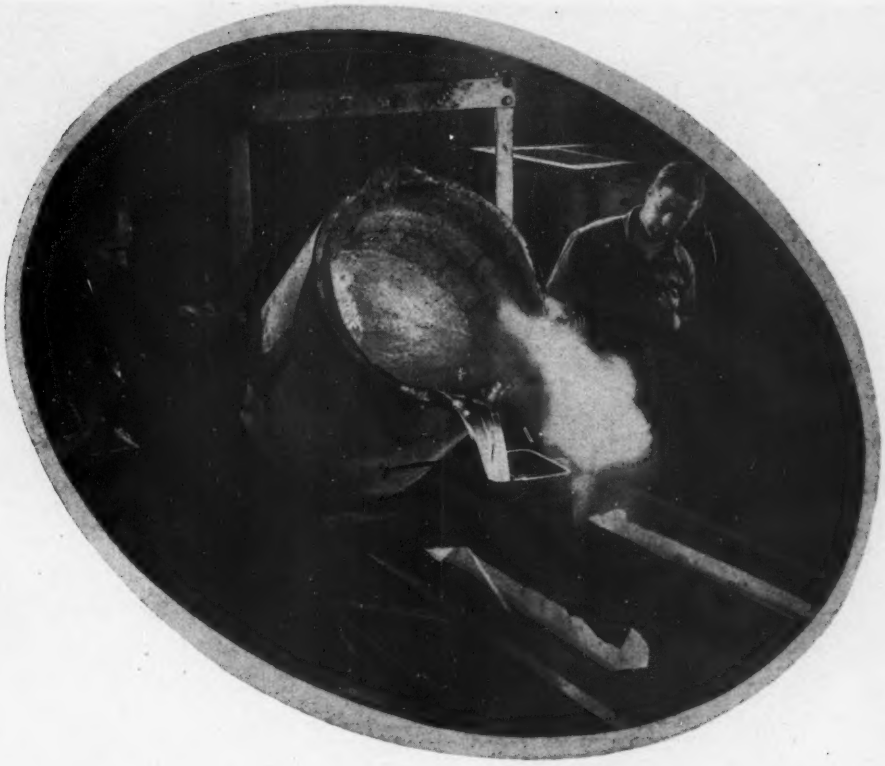
Air Marshal J. N. Boothman (K.B.E.)

Mr. H. T. Chapman (C.B.E.)

Air Chief Marshal Sir Hugh Lloyd (K.C.B.)

G/C. John Cunningham (O.B.E)

A.V-M. N. H. D'Aeth (C.B.)



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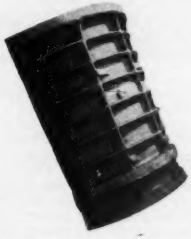

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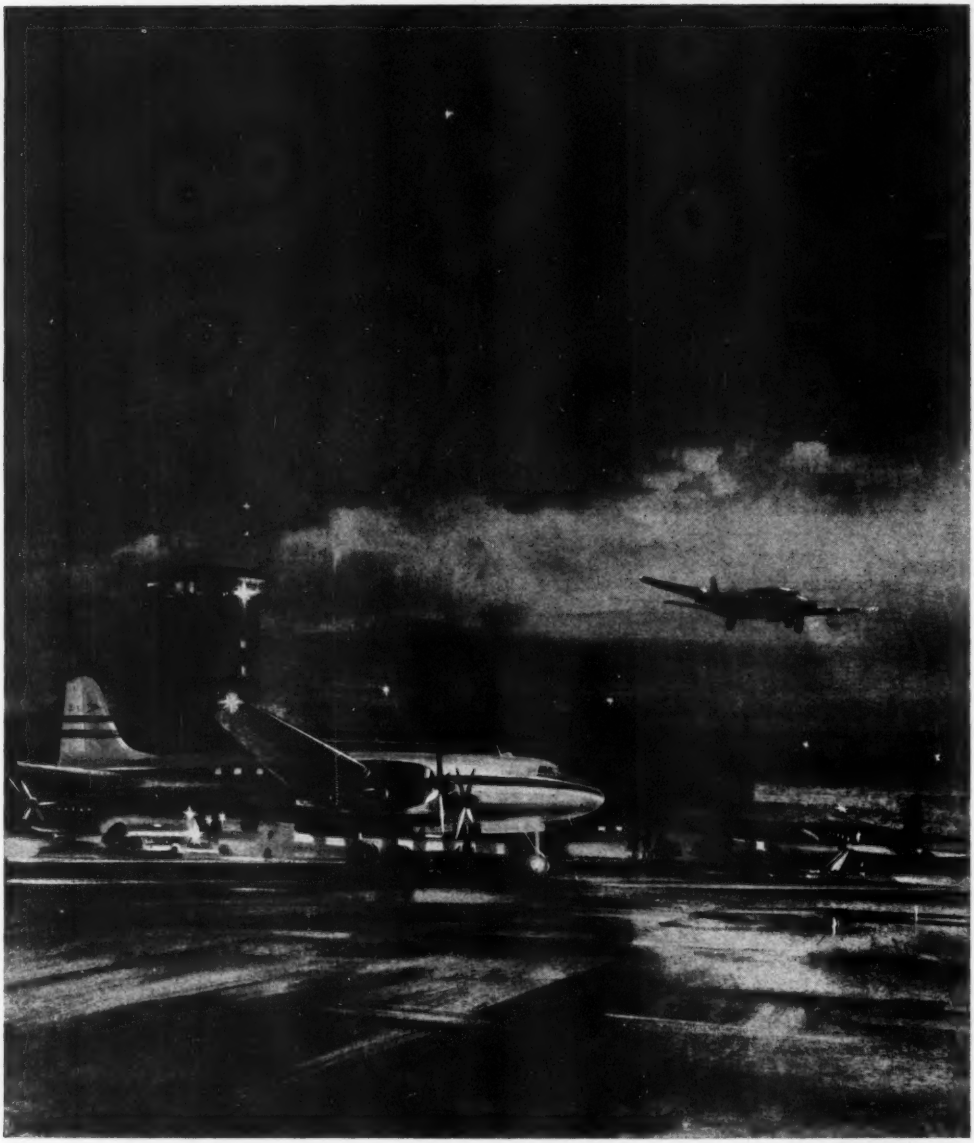

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Biplanes over London

PEOPLE should look long and lovingly at the biplanes, such as Rapides and occasional (and rather naughty) Tiger Moths which fly over London and other big cities, for it will not be many years before such aircraft are seen only at air shows, struggling off the ground with apparent difficulty, and classed as museum-pieces. In the days just before (and even during) the 1914-18 war I saw several Blériots over central London, and I have seen, and flown in, many Avro 504k biplanes over the same area.

Will people in another 20 years roar with laughter at the amusing antics of a Rapide, which may be one of those which are now taking sightseers from London Airport or Northolt every fine week-end to see London, and especially the Festival grounds, from the air?

London, S.W.3. GEOFFREY DORMAN.

Facing the Tail

WITH reference to the letter from your correspondent "A.D." of Los Angeles (June 1st), and in view of the frequency with which the Air Registration Board is misquoted on this subject, you might like to print the actual text of the United Kingdom proposal to I.C.A.O. This proposal was initiated and supported by the Air Registration Board, and was as follows: —

"*Proposal.* In order to give guidance to Member States it is felt desirable that I.C.A.O. should recommend that :—

'In aeroplanes with accommodation for more than six passengers, passenger seats intended for occupation during take-off and landing should, as far as possible, be rearward-facing so as to provide maximum protection in the event of a crash or emergency landing. When forward-facing seats are installed, they should be so arranged that the space in front of each is clear of obstructions against which the occupant's head might strike should he pivot forward against the restraint of the safety belt.'

"It is suggested that consideration be given to defining the 'clear space' referred to above. It might take the form of an arc of 'X' radius about the intersection of the seat and seat back. Medical statistics suggest that the average height of a seated man (chair level to top of head) is 36in with a normal range of ±3in. The arc described by the head will approximate to this seated height plus any allowance considered necessary for looseness of the belt.

"*Discussion.* The U.K. is completely convinced that a very real increase in safety in crash conditions can be provided by rearward-facing seats. The following seem powerful arguments in their favour :—

'(1) It is known that many casualties have been due to injury to the head striking hard objects when the body pivots forward about the safety belt. This is totally avoided, up to the strength of the seat, with rearward-facing seats.

'(2) Allied to the above is the shock and confusion caused to the passengers by the distinctly unpleasant experience of being restrained violently by a safety belt. This does not aid clear thinking just when it may be particularly necessary in the few seconds before the fatal fire all too frequently associated with crashes.

'(3) Medical evidence has shown that the support afforded to the human body by a rearward-facing seat allows a very high deceleration to be accepted without sustaining internal injuries.

'(4) If with forward-facing seating one passenger towards the rear of the passenger accommodation takes some of his weight on his arms on the seat ahead, or does not use his safety belt correctly, it will overload the seat ahead and may cause it to fail below the design crash acceleration. This may then initiate a series of failures embracing all the seats ahead. This possibility is completely avoided with rearward-facing seats.'

"The U.K. does not believe there to be any insuperable difficulty or great weight-penalty in designing rearward-facing seats of either the fixed or adjustable types for the strengths associated with the proposed acceleration values. It is appreciated that there might be a serious waste of space in very small aeroplanes without separate passenger and crew accommodation, hence the arbitrary minimum of six passengers suggested. Face-to-face (i.e., Pullman type) seating has much to recommend it from the passenger's point of view and, provided safety belts are correctly used by the forward-facing passengers, does provide an absence of obstructions likely to cause head injuries.

"In these circumstances, the U.K. has phrased its proposal so as to give the maximum freedom for seating arrangements consistent with achieving an improved safety standard and, in particular, discouraging high-density forward-facing layouts which it can only consider to be quite unnecessarily hazardous."

From the above, it will be observed that the Air Registration Board did not propose to impose a restrictive standard on I.C.A.O. members who might not wish it, but rather that an I.C.A.O. recommendation should be published which would attract attention to how greater safety may be obtained and unnecessary hazards avoided.

Whilst it is the Board's business to strive for reasonable safety, it is at all times anxious to avoid unnecessary restriction or regimentation of the passenger.

To put this matter in the right perspective, it is believed that, whereas crash casualties would be reduced by turning the seats round, this reduction could not amount to a large percentage of the total. In these circumstances, the Board feels that where there is no great hardship in installing the seats to face backward, and when people can be educated to believe this, seats should be so installed. The Board does not believe, however, that it should be so rigid that its requirements prohibit a passenger who knows he wants to face forward from doing so.

London, W.C.2. R. E. HARDINGHAM,
Secretary and Chief Executive,
Air Registration Board.

Desert Crossings

AFTER many years of faithfully reading your so-interesting magazine, I have been badly impressed by encountering "Angola by Aerovan" (May 4th), the diary of a delivery flight down the West African coast. In it the author writes in a very personal way about his contacts with the Agadir Flying Control on February 18th this year.

As the C.O. of the Naval Air Station Agadir (twin-engine conversion unit and navigation school) I have more than a feeling that the "facts" shortly reported in the diary are considerably different from those which truly obtained.

Mainly, isn't it strange to see a British aircraft captain of sound experience thinking that "everything is O.K." when intending to fly from Agadir to Villa Cisneros with a light twin-engine aircraft through an officially declared "desert area," without any W/T. radio equipment (only an R/T. V.H.F. set on board), and without any desert equipment, emergency rations, flares—all items covered by international regulations? And Mr. Martin Cherry forgets to write that, in addition to the above failures, one passenger was not on the list.

I very much applaud, too, the brilliant way the author turns mention of these little gadgets (which are, unfortunately, serious things in Flying Control language) into officious behaviour by, as he says, "some French Air Force lieutenant"—who was, in fact, the Naval Lieutenant Air Controller certificated in charge of the local Flying Control, under my command.

All that is fun—but is it really? And above all, is it fair? Remaining your faithful reader.

Agadir, French Morocco. M. F. CLAVEL,
Capne. de Corvette.

FORTHCOMING EVENTS

June 15-18.	Royal Danish Aero Club: International Rally.
June 15-July 1.	Paris Aero Show.
June 23.	R.Ae.C.: Festival of Britain National Air Races, Hatfield.
June 24.	International Rally, Pisa, Italy.
June 24.	Northern Heights Model Flying Club: Gala Day, Hawker Airfield, Langley.
June 27-28.	Institute of the Aeronautical Sciences: Annual Summer Meeting, Los Angeles.
June 30-July 1.	Cognac International Rally, France.
June 30-July 2.	R.Ae.C.: Members' Deauville Rally.
July 1.	International Rally, Savona, Italy.
July 4-11.	F.A.I. Committee Meetings, Brussels.
July 7-8.	R.Ae.C.: Members' La Baule Rally.
July 7-8.	International Wakefield Cup Model Contests, Finland.
July 14.	Bristol Corporation: Air Race Meeting.
July 14.	S.M.A.E. Festival of Britain Model Championships, Wembley
July 15-18.	Royal Danish Aero Club: Rally.
July 15-22.	Aero Club of Italy: International Air Week.
July 16-20.	Aeronautical Union of Jugoslavia: International Parachute-Jumping Competitions.
July 19-21.	*Daily Express* and R.Ae.C.: International Rally and "Fifty Years of Flying" Display and Exhibition.

SERVICE AVIATION

Royal Air Force and Naval Aviation News

CHOCKS AWAY: Lt. H. MacDonald, No. 2 Sqn., S.A.A.F., about to take off for his 30th operation in Korea. The Mustang is armed with six 5-in rockets. The S.A.A.F. operate under the command of the U.S. Fifth Air Force.

King's Birthday Fly-past

FOUR wings of fighters, comprising 96 Vampires and Meteors, flew past Buckingham Palace in honour of the King's official birthday on June 7th. The formation, which was stepped down from 1,500ft in front to 1,200ft in the rear, approached the Palace from the direction of the Admiralty Arch on a track parallel to the Mall; the set speed was 320 m.p.h. Air Marshal Sir Basil Embry was responsible for organizing the fly-past.

The leading wing of 24 Vampires, led by W/C. A. C. Rawlinson, D.F.C., had representatives from No. 421 Squadron, R.C.A.F., which is now operating with Fighter Command. The three Meteor wings following were led by W/C. J. M. Thompson, D.S.O., D.F.C., W/C. Pitt-Brown, D.F.C., and S/L. A. G. Conway, D.F.C., respectively. One of the aircraft in the final Meteor formation was carrying a refuelling probe in the nose.

The King's birthday was celebrated throughout the R.A.F. by ceremonial parades. One of the most interesting of these took place at Bridgnorth, Salop, where the new King's Colour, recently presented to the R.A.F., was marched through the town—its escort with fixed bayonets. This privilege comes by virtue of the Freedom of Entry, conferred on the R.A.F. by Bridgnorth last year. It is more than 300 years since armed troops marched through the North Gate; this was when Cromwell's troops captured the town.

Air Staff Chiefs Meet

ON Thursday of last week the Chiefs of Air Staffs of Canada, France, United Kingdom and United States met in Paris to continue discussions started in May in Washington. While Air Marshal W. A. Curtis (Canada) is on this side of the Atlantic he will also take the opportunity of visiting No. 421 (Red Indian) Squadron, R.C.A.F., which is at Odiham.

Appointments

AFTER two years as A.O.A., Middle East Air Force, A.V-M. W. E. Theak, C.B., C.B.E., is to be A.O.C., No. 90 Group. His place in M.E.A.F. will be taken by A.V-M. J. A. Gray, C.B., C.B.E., D.F.C., G.M.

A.Cdre. V. S. Ewing, C.B.E., M.B., B.Ch., D.P.H., is to be principal Medical Officer, M.E.A.F., with the acting rank of air vice-marshal.

G/C. J. R. Mutch, C.B., R.A.F., has been seconded for service as Assistant Chief of Staff (Supply and Technical Services), Royal Pakistan Air Force. He will have the acting rank of air commodore.

The B.A.F.O. DISTANCE RECORD, a shield and congratulations from Air Marshal Sir Thomas Williams were all won by F/L. D. E. Osland for his 364.5 km flight at the 1951 B.A.F.O. gliding competition at Scharfoldendorf. F/L. Osland came first in the Individual Class A competition.

Middle East Exercise

UNDER the code name Exercise Contentment, the R.A.F. in the Middle East, with certain Meteor squadrons of the Royal Egyptian Air Force, are to hold extensive air exercises during the period from June 25th to 29th. All the Middle East fighter units will be employed to combat "enemy" forces operating from Cyprus against the Canal zone. Britain-based fighter and bomber squadrons will be woven into the scheme.

New C.O. for Durham Squadron

THE Air Ministry has announced the appointment of S/L. A. Babington Dunford, D.F.C., to command No. 607 (County of Durham) Squadron, R.Aux.A.F.

During the war S/L. Dunford served with H.Q. No. 222 Group in Ceylon and with No. 155 Squadron in Burma—where he won his D.F.C. At the finish of his operational tour he had a spell as a flying instructor in the Middle East and then joined No. 683 Squadron, M.E.A.F. S/L. Dunford has been with No. 607 since February, 1947.

Cooper Trophy Race

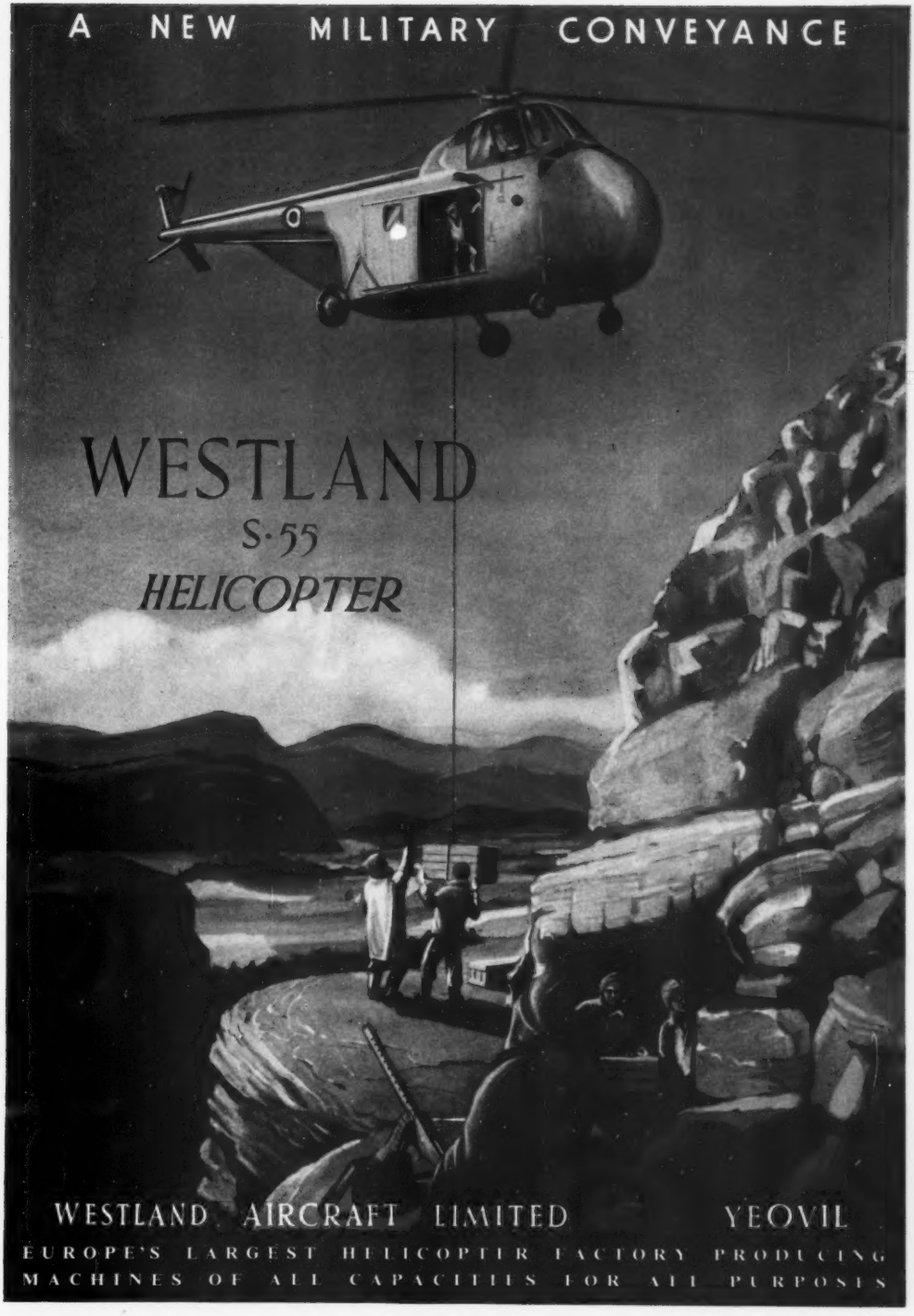
THE eight Royal Auxiliary Air Force pilots to take part in the Cooper Trophy contest to be held during the National Air Races at Hatfield, on June 23rd, are :—

Squadron	*Pilot*	*Aircraft*
No. 500 (County of Kent)	F/O. D. de Villiers	Meteor 3
No. 600 (City of London)	S/L. J. P. Meadows, D.F.C.	Meteor 4
No. 603 (City of Edinburgh)	F/L. D. McIntosh	Spitfire 22
No. 607 (County of Durham)	P/O. M. C. Butcher	Spitfire 22
No. 609 (West Riding)	Cdt/O. J. W. Heath	Meteor 4
No. 610 (County of Chester)	F/O. M. Twomey	Spitfire 22
No. 615 (County of Surrey)	F/O. J. W. C. Judge	Meteor 4
No. 616 (South Yorkshire)	F/L. B. Kneath, D.F.C.	Meteor 4

The race is an annual handicap contest, open to all the R.Aux.A.F. fighter squadrons, for a trophy presented by W/C. G. Cooper, M.P. Eliminating heats were held during May. The present holders are No. 600 Squadron.

Malay Officers for R.A.F. Regt.

THE first four officer-candidates for the locally raised R.A.F. Regiment (Malaya) were due to leave Singapore by Transport Command aircraft last Thursday morning,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EUROPE'S LARGEST HELICOPTER FACTORY PRODUCING
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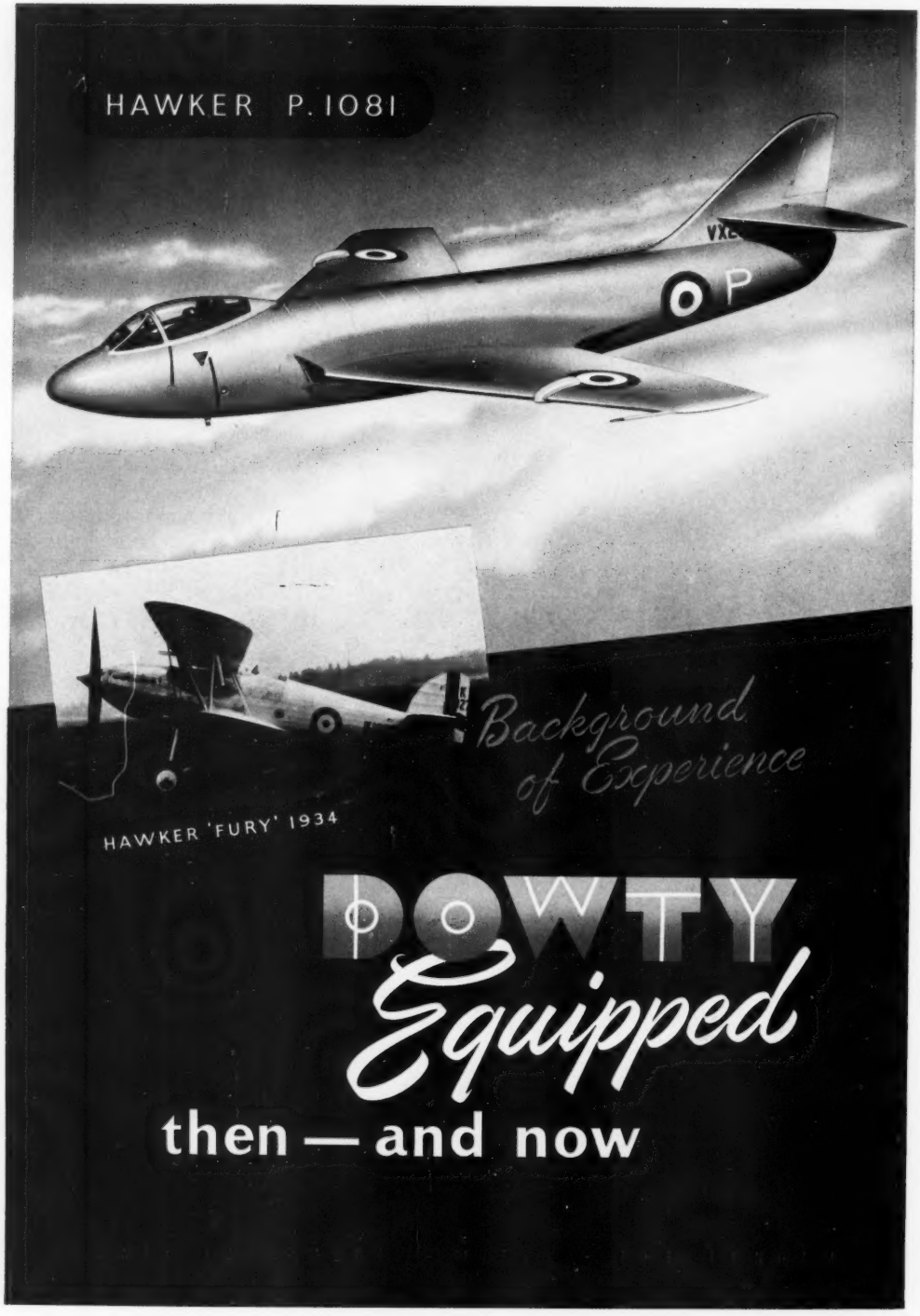
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Background of Experience
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Equipped
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SERVICE AVIATION . . .

for training as officer cadets in England.

They will be given three weeks' acclimatization course at the R.A.F. Regiment Depot, Catterick, then a six-week O.C.T.U. course at R.A.F. Station, Grantham, after which those finally qualified will graduate as officers. They will then attend courses in junior tactics and weapon training at R.A.F. Regiment Depot, Catterick, and at the R.A.F. Regiment Anti-Aircraft Gunnery School, before returning to Singapore.

Throughout their training in Britain they will live with their R.A.F. opposite numbers undergoing similar training.

Naval Aide-de-Camp

CAPT. C. B. TIDD, who was recently appointed a Naval Aide-de-Camp to the King, served in the Fleet Air Arm for 14 years and holds the rank of wing commander in the R.A.F.

Memorial Service

A MEMORIAL service for the late S/L. Keith Lofts of No. 604 Squadron, R.Aux.A.F., who lost his life recently in an accident while competing for the Cooper Trophy, was held at St. James's Church, Piccadilly, on June 6th.

The Rev. Arnold Hellicar officiated, assisted by the Rev. J. N. Keeling, Assistant Chaplain-in-Chief, R.A.F.

Battle of Britain Week Receipts

THE R.A.F. Benevolent Fund has received the sum of £17,787 from R.A.F. Association branches throughout the country as a result of branch activities during Battle of Britain Week.

This is an increase of over £5,000 on the total for the previous year and donations are still being received.

Squadron Badge for O.U.A.S.

AT Oxford, last Friday, June 8th, a squadron badge bearing the King's signature was presented to the Oxford University Air Squadron by Mr. Aidan Crawley, Under-Secretary of State for Air. Dr. John Lowe, the Vice-Chancellor and Dean of Christ Church, received the badge on behalf of the squadron.

Incorporated in the badge is the book, inscribed "Dominus Illuminato Mea" which figures in the arms of the university. There is also a sword, signifying the function for which the squadron is trained, and a Bedel's stave, emphasizing its close association with the university. Beneath is a motto, from Aristophanes's *The Clouds*, which may be translated as "I walk the skies and keep my thoughts in the sun."

The squadron, 250 of whose members gave their lives in the war, was founded in 1925, and its earliest aircraft were Avro 504Ks, D.H.9As and Bristol Fighters. It is now equipped with Chipmunks. The present commanding officer is W/C. F. A Willan, D.C.F.

R.A.F. Helps R.A.A.F. on Meteors

FOUR R.A.F. pilots, F/Ls. M. Scannel, A.F.C.; C. I. Blyth, A.F.C., and F. Easley and Sgt. R. L. R. Lamb are now at Iwakuni in Japan to assist No. 77 Squadron, R.A.A.F., in its conversion from Mustangs to Meteor 8s. F/Ls. Scannel and Easley are from Fighter Command and the other two pilots are flying instructors from Flying Training Command.

The R.A.F. pilots joined the Australian squadron while it was still in Korea, in order to see the type of country over which the Meteors would have to operate.

NATURE'S MAJESTY: This striking photograph of a Boulton Paul Balliol flying along the Grand Canyon, Colorado, was taken from another Balliol by S/L. F. B. Sowrey, R.A.F., who accompanied the aircraft on the evaluation trials carried out by the U.S.A.F. When the picture was secured the machines were flying at 7,000ft, just below the lip of the Canyon.

Aird Whyte Trophy

PRESENTED in memory of their son, Sgt. N. F. Aird Whyte, the Aird Whyte Challenge Trophy was formally handed over by his parents last week at Coastal Command headquarters, Northwood, Middlesex, to Air Marshal A. C. Stevens, recently appointed A.O. C-in-C.

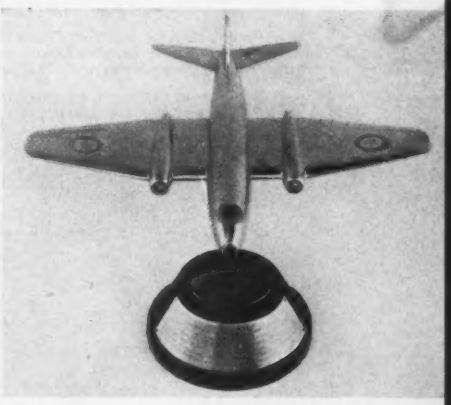
The first competition for the new trophy will be held next August and will be open to all squadrons of the Command. The winners will be the unit obtaining the highest score in simulated operational gunnery attacks on a waterborne moving target. Sgt. Aird Whyte was an air gunner with Coastal Command and lost his life on operations in 1943.

Presentations to Canberra Crew

PRESENTATIONS of gold watches and a silver model of the Canberra were made at a luncheon given in London on June 7th by the chairman and directors of the English Electric Co., Ltd. Commemorating the Canberra's Atlantic crossing on February 21st, the luncheon was attended by Mr. George Strauss, the Minister of Supply, and Mr. Arthur Henderson, the Secretary of State for Air.

Gold watches were presented by Sir George Nelson (chairman English Electric) to two members of the crew, S/L. A. E. Callard, D.F.C., and F/L. A. J. R. Robson. The third member, F/L. E. A. J. Haskett, D.F.C., is held up in Khartoum, and a gold watch is being sent to him.

A silver model of the Canberra was also received by A.Cdre. A. W. B. MacDonald, C.B., A.F.C., on behalf of the officers' Mess of R.A.F. Station, Boscombe Down.



The silver model Canberra presented to Boscombe Down, as related on this page

R.A.F.A. CONFERENCE

IT must have been the soporific effect of the warm sunshine, soft air and blue skies of Torquay that enabled the 1951 R.A.F.A. conference, held last week-end, to go through with so little acrimony; and maybe the unconventional outlook of Air Marshal Sir Richard Peck in the chair helped a good deal. Whatever the reason, the delegates heard a Scotsman asking for an increase in the annual subscription, an Irishman apologizing for speaking against a resolution and a Lancashire delegate saying how sorry he was to keep talking.

The programme opened on Saturday morning with an address of welcome by the Mayor of Torquay, Alderman E. G. Ely, who reminded the 395 delegates of the R.A.F.'s association with the town during the war when an Initial Training Wing was stationed there. Then, after the "Silent Tribute," which the R.A.F.A. always holds at the start of its annual conference, Sir Richard struck a lighter note with the classic announcement: "Let battle commence."

Since care for ex-members of the R.A.F. is the first aim of the association, it was appropriate that the discussion of pensions should head the agenda.

Any resolutions in these matters could, of course, only be recommendations to the Ministry of Pensions, but of their importance there can be no doubt. The most telling was from the local branch at Plymouth, pointing out that in the 33 years which had elapsed since 1918, the basic 100 per cent disability pension had increased only from 40s to 45s. Delegates applauded a resolution from Chislehurst and Sidcup asking that eligibility for the "constant-attendance" allowance be extended to disabled pensioners who are in need of constant attention but whose disability award is less that 100 per cent because of the acceptance of the disability as being only "aggravated" by service.

Amendments to resolutions being ruled out as time-wasting, the conference kept to time schedule and moved on to discuss welfare. A request by Cheltenham for a revision of the system and wording of testimonials of ex-R.A.F. and W.R.A.F. personnel brought a reply from A. Cdre. Coats, A.O.C. Records Office, stating that a completely new and much improved Air Ministry order on the subject was now applicable.

Another interesting resolution in this section was one asking H.Q., R.A.F.A., to set up an executor and trustee department. This idea had the sympathy of everyone present and it was with regret that G/C. Vaughan, K.C., Recorder of Lincoln and chairman of the R.A.F.A. National Council, had to point out the legal pitfalls of such a course; chief of these was the fact that all estate was not left to the immediate relatives by ex-Service personnel and therefore it followed that much of the Association's time and money might be devoted to non-members' interests. He also pointed out that before a trustee department such as was envisaged could come into being, funds to the amount of £100,000 would have to be found.

The first "battle" developed over a resolution by Richmond asking the conference to express an opinion that the newly opened Continental Office on its present scale was "an ill-timed venture." This resolution was lost after the delegates had been told that the amount involved was strictly limited and that the "palatial" headquarters were really only two rooms, rented from the "Free French" H.Q. for £120 per annum. (Actually this appears to be a very worthy cause, catering as it does for the many French, Belgian and Dutch personnel who served with the R.A.F. during the war. Another office is shortly to open at Berne and this, it is hoped, will be able to help ex-R.A.F. tubercular cases under treatment in Swiss sanatoria.)

Partly as a result of reduced membership, the association's accounts show a deficit of £25,000 for the year and to help remedy this state of affairs it has been decided to institute a flag day under the name of "Wings Day." The National Council's ideas on this innovation were put clearly by G/C. Vaughan, after which the delegates discussed the subject very largely on a basis of counting chickens before eggs were hatched, viz., by allocating varying percentages of the proceeds to the branch, area and H.Q. funds and to other Service charities. Returning to "the battle for the swag," as he called it, G/C. Vaughan pointed out that £20,000 would have to be made before there would be any swag to distribute and would not agree to any predivision of takings other than "a sum of not less than 10 per cent of its own proceeds should go to each participating branch."

The session dealing with relations between the Association and the R.A.F. Benevolent Fund brought no great differences of opinion and the remainder of the day was spent in discussing rules.

Before proceedings opened on Sunday, a parade and service were held at the war memorial in the Princess gardens, adjoining the conference hall. It was inspiring to see the 189 branch standards, forming a colourful hollow square, dipped in salute as the chaplain, the Rev. H. L. O. Rees, read Lawrence Binyon's exquisite lines, "They shall grow not old, as we that are left grow old! Age shall not weary them, nor the years condemn. At the going down of the sun and in the morning we will remember them"—at the end of which all responded, "We will remember them." Wreaths of Haig poppies were laid by Sir Richard Peck and the Mayor of Torquay.

The first session of the second day dealt with finance, and the hon. treasurer, Mr. F. W. Lindgren, explained matters in some detail. Overall expenditure was £88,000, subscriptions were down by £10,000 and there had been a depreciation of £20,000 in the market value of gilt-edged securities. To combat this depreciation a sum of £55,000 had been invested in industrial debentures. The loss of revenue from subscriptions led to a host of resolutions for increasing or reducing the annual amount in the hope of improving income, and to cut some of the cost of the publication *Air Mail* which, because of increased printing and distribution costs, would go up from £17,000 to £22,350. The subscription was left at 7s 6d and it was decided to reduce *Air Mail* to six 12-page issues per annum.

The conference ended on a very pleasant note—the tributes to the chair bringing visible blushes to the face of Sir Richard Peck, who then adroitly passed all the verbal bouquets back to the delegates on the floor of the hall and to what was frequently referred to as the "rogues gallery" on the platform.

Mr. Boak, the general secretary, is to be congratulated on the excellent organization, Torquay on its charming hospitality and the Weather Clerk on warm sunshine and tranquil skies.

At the R.A.F.A. memorial service: (Left) The Mayor and Mayoress of Torquay with Air Marshal Sir Richard Peck and the Rev. H. L. O. Rees. (Right) Air Chief Marshal Sir Christopher Courtney, Dame Helen Gwynne-Vaughan and Air Marshal Sir Robert H. M. S. Saunby. "Flight" photographs

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Big R.A.F. Bisley Meet

MORE than 1,400 competitors—officers, airmen and airwomen—a record number, are shooting this week in the 25th annual Bisley Meeting of the R.A.F. Small Arms Association. So great is the interest this year that for the first time the Century Range, despite its 100 targets, is inadequate and teams in the Trenchard Trophy inter-station event are competing in two details.

No. 1840's New Home

THE new R.N.V.R. Air Squadron, No. 1840, which is now at Culham, Berkshire, will move to its permanent station at Ford, Sussex, in July. Lt. F. W. Baring will be the senior pilot. No. 1840 will fly Fairey Fireflies.

Experimental Flight

A FLIGHT of two Fireflies and one Anson recently returned to Lee-on-Solent from Gibraltar, after carrying out anti-submarine trials with new requipment, in conjunction with the R.A.F. The flight was led by Lt. M. F. A. Regan.

Naval Appointments

CAPT. A. S. BOLT, D.S.C., R.N., who recently returned from Korea in Command of H.M.S. *Theseus* is appointed Director of Naval Air Warfare. Capt. C. N. Lentaigne, D.S.O., R.N., will take over command of *Theseus*.

When H.M.S. *Ocean* leaves Rosyth after refitting, she will be commanded by Capt. C. L. G. Evans, D.S.O., D.S.C., R.N.

BOAC Canadair "Argonaut" taking off from Kai Tek Airport, Hong Kong

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Flying in giant, luxurious aircraft built by Canadair for Trans-Canada Air Lines, British Overseas Airways Corporation and Canadian Pacific Air Lines . . . today's traveller can circle the globe in just over eighty hours on scheduled flights!

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For thirty years, Canadians have been blazing air trails in commercial travel. In 1919, Quebec began experimental services. Two years later the first flight down the Mackenzie River was completed. In 1923, Ontario instituted its first air lines. By 1930, the Western Provinces had followed suit.

The Trans Canada Airway, beginning to swing into operation by 1935, laid the foundation for a trunk service from coast to coast.

Today, across Canada, local services provide air travel into territories previously inaccessible. The two great Canadian Airlines, T.C.A. and C.P.A., flew nearly 30,000,000 revenue miles in 1950.

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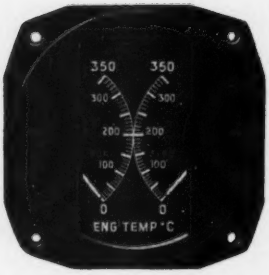
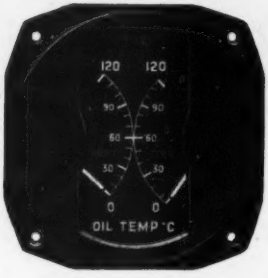
The comprehensive range of Weston temperature measuring instruments covers the requirements of existing production aircraft, as well as types now under development. In addition to thermometry for the indication of cylinder, air, oil and radiator temperatures, Weston equipment for aircraft includes instruments for power supply, navigational aid instruments, selector switches, etc.



WESTON
AIRCRAFT INSTRUMENTS



Illustrations show:

Above, Model S128. Dual Engine Temperature Indicator, comprising two Millivoltmeters of 100° scale housed in large-size S.A.E. case. For use in conjunction with copper/constantan, iron/constantan or chrome/alumel thermocouples.

Below, Model S127. Dual Ratiometer Indicator, comprising two 100° Ratiometer movements housed in large-size S.A.E. case. For use in conjunction with thermometer bulbs, electrical oil pressure transmitters, electrical position indicators or any combination of two of these to indicate a variety of temperatures, pressures or position.

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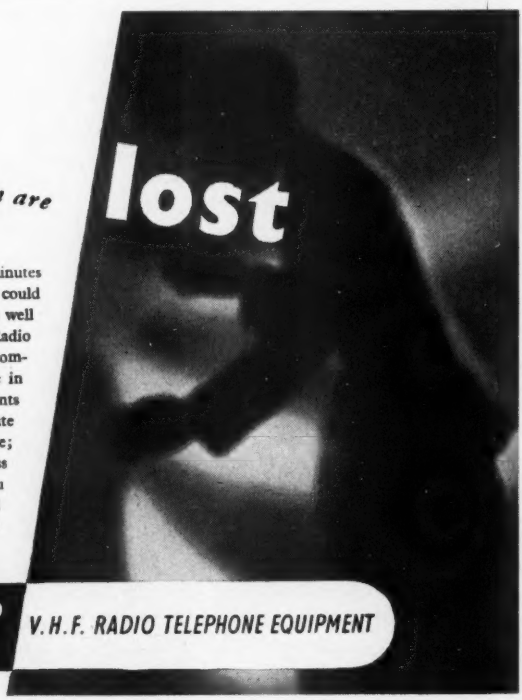

Out of touch with that change of plans you had to make five minutes after they drove away from the aerodrome. A few words now could save time that is worth good money. As it is they might as well be lost in the Sahara — unless you install G.E.C. V.H.F. Radio Telephone Equipment; then you can be in immediate communication at any time with your transport. You can be in constant touch with Control Points, Fire Centres, Luggage Points and Ambulance Unit. You can have literally your own private two-way Broadcasting Station — as simple to work as a telephone; the vehicle installations can also be used as a public address system. Compact and completely reliable, this set gives you a new power to handle a crisis, to seize an opportunity and drastically cut down running costs. There is a wide range of V.H.F. and H.F. equipment. Please write today for full particulars.

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NIGHT SCENE at Schiphol, Holland's international airport, as a K.L.M. Constellation prepares to leave for the Far East.

CIVIL AVIATION

R.A.F. AIRCREWS FOR AIRLINES

WE understand that a scheme to use R.A.F. pilots on certain British civil routes this summer is now under consideration. The acute shortage of qualified commercial pilots is causing no little concern to the operators, who in some cases are being faced with the prospect of having to cancel flights. One suggestion is that 50 Service pilots should be seconded to B.E.A., who are already 24 pilots and a number of radio operators below the strength requirements for peak traffic this summer.

The scarcity of pilots holding commercial licences is undoubtedly due to lack of training facilities and the improved prospects which the R.A.F. now offers in the way of conditions and pay. In most instances companies are having to raise the acceptable age limits and lower their minimum qualifications required, in order to rake in the few remaining pilots still available. The shortage is to be regarded as an exceptionally serious affair which is of the greatest national importance. In our view, it can only be remedied by immediate official action to provide better training facilities and improved status for pilots intending to make a career of civil aviation.

NEW YORK'S HELICOPTERS

HELICOPTER services are about to be introduced within the metropolitan area of New York. They will be operated by the Port of New York Authority and, although at present they will be restricted to use by the Authority's own officials, a move is being made to obtain C.A.B. authority to run passenger, mail and cargo flights; these services would connect the three major metropolitan airports with Manhattan and other communities within a 50-mile radius. A recommendation by a C.A.B. examiner, however, has suggested that passenger services should be limited to flights between the three main airports.

With the introduction of the new facilities, the Authority's engineers and maintenance personnel—who make regular visits to the airports and other installations—will be able to take advantage of great reductions in travelling time between their points of inspection. A trip from Idlewild to Newark airport, for example, will occupy only 20 min.

BRITISH AIRPORTS IN APRIL

THE total of passengers handled at British civil airports in April was, at 169,518, slightly higher than in the corresponding month of the previous year. Air transport movements, however, fell from 12,586 to 13,894, which is explained by the fact that, whereas in 1950 the April total was augmented by the Easter holiday traffic, this year Easter came in March. The most spectacular increase in traffic was seen in the amount of freight lifted which, at 3,663 short tons, was 51.9 per cent higher than last year's total.

Passenger movements at London Airport tended to show a sharp increase (about 40 per cent), while the transfer of services from Northolt to London was reflected in an 11 per cent decrease in the Northolt total. The next busiest airport for passenger traffic was Glasgow, followed by Belfast and Prestwick.

ISLE OF MAN VISITORS

DURING the Tourist Trophy motor cycle race week Lord Douglas of Kirtleside and Mr. Peter Masefield, chairman and chief executive of the B.E.A., visited the Isle of Man and were the guests of the Lieutenant Governor, Sir Geoffrey Bromet, and Lady Bromet. On Thursday, June 7th, they attended an At Home at Government House and in the evening continued conversations over dinner, at the Fort Anne Hotel, Douglas, with the airport officials of Ronaldsway as to future plans.

The party arrived at Isle of Man in a Heron—the four-engined 17-seater development of the Dove—and, piloted by Mr. Masefield, we enjoyed a trip around the Island on this promising new feeder liner. We understand that the B.E.A. engineers are giving the Heron a month's special tests and recording results, but its adoption is not at present forseen.

AER LINGUS SERVICES

TO cater for increasing summer holiday traffic, Aer Lingus introduced extra services on almost all its routes at the beginning of this month. The London-Dublin route has 30 extra services each week, including an additional Sunday service and the duplication of the existing once-nightly "Starflights." Three extra Saturday London-Glasgow services are being provided, together with a Sunday service to Glasgow and an extra Saturday service to Liverpool.

Extra flights on the Birmingham and Dublin-Manchester routes are now in force, and for the first time this year there is a daily service to the Isle of Man with extra flights on Saturdays and Sundays. The once-weekly Jersey service has been duplicated on Sundays, and an additional service on the Paris route has been provided on Tuesdays, making a return service available on four days of the week.

CHARTERS—PASSENGERS NOT FREIGHT

AIR charter market conditions are now, it seems, a complete reversal of those experienced before Whitsuntide. Whereas previously all the demand had been for freight aircraft, offers in this class are now described as extremely light, and activity is found chiefly in the revival of movements of ships' crews, mostly from the Far East to Europe. Additionally, there is some holiday traffic to the Continent. Thus the demand has been for the larger passenger aircraft, and operators of the large specialized freighters are for the moment having a thin time.

All Hong Kong traffic has come to an end, chiefly because of the uncertainties regarding the clearance of payments and the embargoes on certain goods.

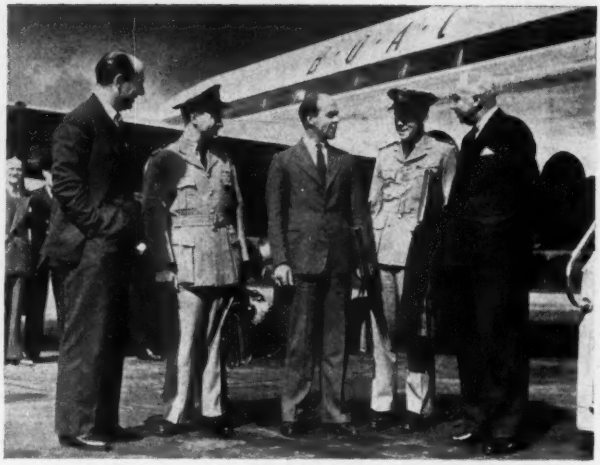
CIVIL AVIATION . . .

B.O.A.C.'s Comet Trials

RETURNING from its first overseas operational development flight recently, the D.H. Comet which is on loan to B.O.A.C. was met by Sir Miles Thomas, chairman of the Corporation. He said that no mechanical troubles were experienced during the flight (of over 5,000 miles, much of it in the Mediterranean area) which had fully justified the faith B.O.A.C. had placed in this type of aircraft.

In the photograph reproduced here, Sir Miles Thomas (extreme right) is seen with the deputy chairman, Mr. Whitney Strait (extreme left), welcoming the manager of B.O.A.C.'s Comet Unit, Capt. M. J. R. Alderson, who is standing between Capt. E. E. Rodley and Capt. A. E. Majendie, the two pilots who flew the Comet during the trials. Four days after its return, the Comet left again on a second development flight to Cairo.

Although B.O.A.C. has 14 Comets on order, the specification for the five of them which will be powered by Avons has yet to be decided. In addition, also, negotiations are known to be in hand to increase the total order from 14 to 20; the six additional machines would also be Avon-powered.



WELCOME HOME: The return, to London Airport, of B.O.A.C.'s first Comet overseas development flight, referred to in the adjacent paragraph.

U.S. Feederliner Project

AMERICA'S urgent need for suitable feederliners is emphasized by the fact that a bill to authorize $8 million for their design, development and construction is now under consideration. The project would be carried out under contract. Prospective operators have estimated that a suitable design could save between two and three million dollars a year in subsidy payments to small carriers, so that the entire cost of development should be covered after three years of operation.

Hitherto manufacturers have seemed unwilling to undertake such a project on their own initiative. The specification for a large feederliner still stands, although it is generally admitted that many companies could not economically use an aircraft of such proportions. These operators might still be interested in British aircraft in the Heron or Marathon category.

It is interesting to note, also, that one-third of the total allotment requested for the prototype-testing of American designs in 1952 is being set aside for operational trials with helicopters. Experiments may soon begin with passenger helicopters over certain feeder routes, in addition to passenger operations in large metropolitan areas. Three 8/10-passenger types now under consideration for the military services are likely to be used in simulated airline operations which are due to begin towards the end of this year.

The Cocos Base

IT is announced that G/C. W. A. C. Dale, D.S.O., Director of Works for the R.A.A.F., is to be in charge of the Cocos Island survey, and the construction will be handled by an R.A.A.F. airfield construction unit of some 400 men. A Q.E.A. Catalina has left Sydney for the Islands with a party of surveyors, architects and electrical engineers to examine the facilities available and determine the amount of constructional work necessary to equip the island as a stopping place on the regular service between Australia and South Africa.

BREVITIES

AN I.C.A.O. Technical-Assistance Mission has left for Ethiopia to help develop air transport there. Five Ethiopian pilots have also been chosen to undergo flying training as I.C.A.O. fellowship holders at A.S.T., Hamble; they will train to commercial standard. Hitherto, Ethiopian Airlines have used foreign pilots.

* * *

Trans-Australia Airlines have now purchased an additional DC-3, bringing their total fleet to 38 aircraft, comprising 25 DC-3s, four DC-4s, five Convairs, three D.H. Dragons and one D.H. Drover. Later, five more Drovers will be acquired for use on internal routes.

* * *

K.L.M. has announced what is, in effect, the first commercial airline order for the new hollow-steel bladed airscrews produced by the Curtiss-Wright Corporation. They will be fitted on the company's fleet of nine Lockheed L-1049As, scheduled for delivery in 1952. The blades, produced by a new extrusion process (see *Flight*, March 30th), have already been ordered in quantity by the U.S. Air Force for use on the C.124 Globemasters.

* * *

I.C.A.O.'s Fifth Assembly opened in Montreal on June 5th and was attended by representatives of 35 member nations. The meeting heard addresses by the heads of national delegations, who described the aviation policies of their respective countries. One of the duties before the Assembly was to decide, among other things, on I.C.A.O.'s current budget arrangements. The meeting did not constitute a "major assembly"; these are held in every third year.

* * *

Capt. J. C. Kelly-Rogers, assistant general manager (technical), Aer Lingus, has been elected chairman of the I.A.T.A. Technical Committee. He succeeds Mr. J. T. Dyment, Director of Engineering for T.C.A., and will take office after the annual general meeting, to be held in London in September.

* * *

Experiments with a new method of fog dispersal will begin this autumn under the sponsorship of United Air Lines. One of the company's DC-3s is being equipped to diffuse chemicals designed to disperse fog and stratus clouds over limited areas. United wishes to determine whether the method has a practical application to scheduled airline operations.

* * *

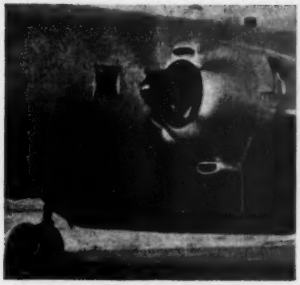
United Air Lines have exercised their option for ten additional twin-engined Convair 340s; this brings to 40 United's total order for these pressurized 44-passenger transports. The 340 is powered by 2,400 h.p. Pratt and Whitney engines and incorporates improvements in size, gross weight, cruising range and passenger comfort as compared with the earlier model 240.

* * *

Major J. R. McCrindle, C.M.G., O.B.E., M.C., adviser on international affairs to B.O.A.C., has received from the Swedish Ambassador in London the Insignia of Commander, Second Class, of the Order of Vasa, bestowed on him by the King of Sweden. Major McCrindle is a member of the board of B.O.A.C. and is also a member of I.A.T.A.'s executive committee.

* * *

A government licence for the first private domestic air transport service to be operated in Japan since the war has been granted to the projected Japan Airline Company, which has been organized by a leading industrialist, Mr. Aiichiro Fujiryama. The company is negotiating for the purchase of two Skymasters and four Dakotas and proposes to contract with foreign operators for the supply of necessary equipment and personnel.



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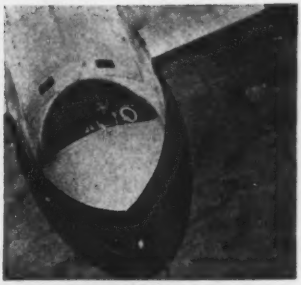

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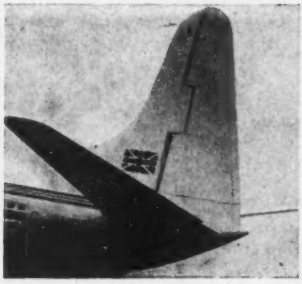

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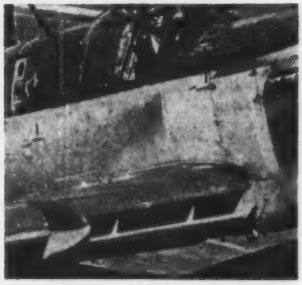

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A Stiff Nut is a one piece nut which complies with R.A.E. Specification No. A.D. 114 — a nut provided with means of increasing the friction between the thread of the nut and that of a standard bolt to an extent that the nut may be considered self-retaining. A Stiff Nut should be as light as is consistent with strength and be able to withstand all conditions of service use. It should be of a design which does not cause undue damage or excessive wear to the thread of the bolt on which it is mounted.

A perfect description, in fact, of the G.K.N. 'Aerotight' Nut — often casually referred to as a Lock Nut or Self-Locking Nut—which has the added advantages that it can be used over and over again without loss of efficiency. Its retentive properties are unaffected by oil, water or humidity.

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Supplied in Steel, Stainless Steel, Light Alloy, Brass and Bronze in Whitworth, B.A. and B.S.F. Threads. Recommended for all applications where vibration is encountered. Economical in use. No need for drilled holes, cotter pins, lock washers, etc.

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The Hermes V draws up alongside the attractively designed terminal building at the "long-distance" Paris airport (Le Bourget is concerned mainly with European traffic). "Flight" photographs

FRANCE SEES the HERMES V

A 46-minute Trip from London to Paris for Demonstrations to Continental Operators

THE Continent had its first view of a Hermes V on Tuesday, June 5th, when the Handley Page four-turboprop airliner was flown from London Airport to Orly for demonstration to French operators.

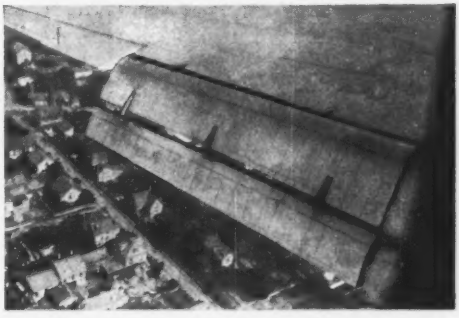
Though having an interior that will, if desired, accommodate 74 passenger seats, G-ALEV (the second prototype, which made this particular trip) is furnished in the luxury style of its piston-engined counterparts, the B.O.A.C. Hermes IVs, with "reclinable" chairs and virtually unbounded leg-room.

At the moment the big question-mark in Hermes V planning concerns the power plant. The 2,820 h.p. Theseus is, of course, installed at present; a new mark of Proteus, with considerably increased performance, is a possibility for production aircraft. In view of Bristol commitments with the Olympus, however, and the fact that a flow of Proteus will be required for their own Type 175 airliner, a problem clearly exists.

However, we are concerned here with the existing Theseus version and its trip to Orly, in which we were invited to participate. Eighteen people were on board, including, among the H.P. representatives, Mr. H. Brittlebank (technical sales), W/C. J. D. H. Slade, recently appointed liaison officer between the firm and its customers, and Mr. S. A. H. Scuffham, public relations. There was a flight crew of three, under H.P. test pilot "Duggie" Broomfield.

The 0816 hr take-off from London Airport was in warm, cloudless conditions, with a beam wind of little account at any altitude. Flying at 81,000 lb a.u.w. (permissible weight of G-ALEV, on a special-category C. of A, is 84,000 lb), Broomfield made a frankly "demonstration" take-off, then settled to a climb that took us up to 10,000 ft in 6½ min.

Thereafter the aircraft cruised at 235 kt I.A.S., with compressor revs at 7,800 and turbines at 8,150 (the Theseus has a "free" turbine, of which more anon). The English coast was crossed at Beachy Head 15 min after take-off, and the French coast, at Dieppe, 13 min later. About 50 miles from Paris the let-down was started, at 600-700ft/min and 285 kt I.A.S.; and 46 min from take-off we were in the Orly circuit, the time representing a ground speed of almost exactly 300 m.p.h. The airport control thereupon spoiled the effect by standing the aircraft off for the inordinately long period of 12 min, although very little other traffic appeared to be moving. Even so, the existing turboprop airliner "record" (the Viscount's 59 min) was just beaten; there can be no accurate comparison, however, for the Viscount flew from Northolt to Le Bourget (190 n.m.); L.A.P. to Orly is 198 n.m.



Final approach to Orly: for take-off, the new double-slotted flaps permit a 2,000 lb a.u.w. increase; the landing run is reduced by 9 per cent.

Even without an airline's colours the Hermes V looks impressive.

As to smoothness, the Hermes V was a little disappointing, but the vibration that was apparent was quite clearly a matter of engine synchronization. In the "free turbine" there is no mechanical connection between the turbine driving the airscrew and the turbine driving the compressor. Because of this fact, and since no two engines are identical in the rate at which they warm up and settle to their work, synchronization is tricky until that period has been passed; after this, we were assured, near-perfect synchronization can be obtained, and the periodic vibration vanishes. The Paris trip was too brief for a fair test.

This same question of free turbines is interesting in relation to approach technique. On the Hermes V the method is to cut the two outer engines to ground idling speed and come in at 7,800 compressor r.p.m. (i.e., max cruise) on the two inners, a rate of descent of about 200ft/min being held and height adjusted by small movements of the power levers. If it should be necessary to go round again, the flight engineer opens up the two outers, which will produce full power after 3-4 sec.

It was possible to talk in comfort, without raising the voice, at any point along the cabin, and the high-frequency engine-scream (or perhaps "whistle" is a better description), so audible outside the aircraft, is effectively damped by the cabin soundproofing. It seemed no more obtrusive than the normal sound of airflow over any moderately clean fuselage..

On arrival at Orly the crew began a strenuous demonstration schedule, taking on board full loads of officials, airline executives and pilots, and giving them an hour or more aloft, several of the pilots being afforded an opportunity to fly "EV" for themselves.

One of the companies whose executives seemed to be taking an unusually close interest was T.A.I. (Transports Aeriens Intercontinentaux). With a fleet of seven DC-4s, heavily utilized, they fly from Paris to Casablanca, Brazzaville, Abidjan, Madagascar and other places in and around Africa. Several of the stages are of a length that would be economic for the Hermes V.

CLUB AND GLIDING NEWS

BRIEF mention was made in *Flight* last week of the results of the Ragosine-Auster Homing Competition, held on Sunday, June 3rd, the day after the Auster Flying Club's rally and display. The competition attracted 22 entrants, including one woman. Pilots varied from students who had not yet qualified for their licences to old hands with a total of 3,000 or 4,000 hours. This annual event takes the form of a navigational exercise over a 100-mile course, covering parts of Leicestershire, Nottinghamshire, Lincolnshire, Rutland and Northamptonshire, the start and finish being at Rearsby airfield.

Although all pilots reached Rearsby safely, only 14 completed the course in the required manner. The winner was judged to be the pilot who completed the course with the smallest number of penalty marks awarded against him; the totals recorded, incidentally, ranged from 5½ to 40 marks.

First prize went to an experienced pilot, Mr. T. B. Meek, of Leicester, who was flying an Autocrat; he had been runner-up in last year's competition. Second prize was taken by a relatively inexperienced pilot, Mr. T. F. Ringer, who qualified for his licence only last year; he was flying an Autocar and his score was 7½ marks. The third place went to Mr. A. Baker in a Autocar, with 10 marks.

The trophy, given by Capt. Wayman of the Ragosine Oil Co., was presented to the winner during the evening by Mrs. F. Bates, the wife of Auster's managing director. The competition is open to all pilots who must, however, be flying some type of Auster aircraft and must also be using Ragosine oil. This year five different types of Auster were included in the 22 entries.

ALTHOUGH practically every week-end during May was ruined by torrential rain or high winds, the Wiltshire Flying Club, at Thruxton, still managed to log 227 hours' flying, which brought the total for the year to the creditable figure of 929 hr. Pupils studying at the airfield for British Junior Commercial Pilots' Licences will, in future, undergo ground training under the supervision of Mr. Keyes of the London School of Air Navigation.

News of one of Thruxton's "old boys", Mr. D. O. Gaughan, who recently obtained his commercial licence at W.F.C., suggests that there are definite prospects of immediate employment for pilots who have been trained *ab initio* to commercial standard. A fortnight after being granted his licence Mr. Gaughan obtained a position with a charter company in the North of England. His employers incidentally, have stated that, despite his relative inexperience so far as hours are concerned, they are well satisfied with his flying ability and general airmanship. They request also that, should the club in future be able to recommend any similar type of pilot, the company would be pleased to offer him a post.

Two more students recently joined the commercial course at Thruxton, one from Switzerland and one from Scotland and three more pupils are expected early in June.

THE French Aéro-Club de Touraine is holding its Rally des Grands Vins de Touraine and des Chateaux de la Loire on August 4th and 5th at the Saint Symphorien (Tours) airfield. The club reminds British pilots that, as in previous years, all visitors will be welcomed.

Further information may be obtained direct from the secretary of the Aero-Club de Touraine, 96 Rue Nationale, Tours.

TOURING pilots who intend to travel in France, Spain and Italy this year, may care to avail themselves of the invitation extended by Blumenthals, Ltd., to visit some of the vineyards responsible for producing world-famous champagnes, liqueurs, sherries and vermouths in those countries. The well-known houses of Ayala, Croizet and Rocher in the French provinces of Champagne, Charente and Isère, were visited by several pilots last year; now the invitations have been extended to include wine-producing installations in Jerez (Spain) and Turin (Italy). The London H.Q. of Blumenthals, Ltd., are at 125 Pall Mall, S.W.1.

FOLLOWING his flight which, on June 3rd, established (subject to confirmation) a new British out-and-return record for single-seat sailplanes, Mr. Philip Wills has told us something of the conditions under which he was able to record a distance of 160 miles from Redhill to Little Rissington and back.

Mr. Wills' Weihe was aero-towed out of Redhill at 1140 hr and was released a quarter of an hour later at 1,600ft. Conditions were hazy, with few clouds and little or no wind, which made it particularly suitable for an out-and-return flight. Little Rissington was reached half an hour behind E.T.A.

Most of the thermals encountered gave the Weihe an average altitude of 3,500ft, although the last thermal of the day did not give out until 5,000ft was reached. Base was eventually regained 6¼ hours after taking off from Redhill.

SOME details are now available of the new British competition sailplane, the Slingsby Sky (type 34), which several British pilots hope to use in the National Contests to be held at the Camphill (Derbyshire) site next month. The sailplane has an 18-metre span and its tare weight with instruments is 550 lb; disposable load is 250 lb. The best gliding angle is 1 in 30 and lowest rate of sink is 2ft/sec at 42 m.p.h. The gliding angle at 65 m.p.h. is 1 in 22, which renders the type particularly suitable for cross-country soaring. Provision is made for oxygen equipment and a full blind flying panel is fitted as standard equipment. The Sky is to go into limited production and is now awaiting A.R.B. approval for its full C. of A.

SINCE the ban on soaring was lifted by the occupation authorities in Western Germany, design and construction work has been going forward on six sailplanes which are being produced under the supervision and sponsorship of the Deutsch Aero-Club.

All of them are tandem two-seaters. The Kondor IV, designed by Heini Dittmar, is a high-performance sailplane of all-wooden construction weighing, empty, 570 lb (260 kg); its dimensions are similar to those of the Kondor III. The Kranich III, the work of Hans Jacobs, is another high-performance type with a span of 59ft (18 m) and an empty weight of 236 lb (105 kg); its wing is of wood but the fuselage (unlike former Kranich models) is formed of welded steel tubing.

The Mu 13E, designed by Egon Scheibe, is also a high-performance type with construction characteristics similar to those of the Kranich III. Fritz Raab of Munich has produced a braced-wing trainer of 41ft (12.5 m) span, in which the instructor occupies a kneeling position immediately behind the pupil, so that he can make steering corrections over his trainee's shoulder.

The designer of the well-known Grunau Baby, Ernst Schneider, is now working on a trainer of 52·5ft (16 m) span—the E.S.49—which is constructed entirely of wood. Finally, the Boomerang—a two-seat trainer design by Gerhard Blessing—is a novel project in which the forward fuselage can also be used, in the words of its designer, as "a roadable motor-scooter."

The first prototypes of these six aircraft are expected to be ready by August.

REPORTS recently received indicate that there has been an impressive growth of interest in sporting aviation in Yugoslavia. The Aeronautical Union of that country now comprises about 200 flying clubs with a membership totalling over 50,000.

At the beginning of last year the Union decided that one of its most urgent problems concerned the construction of airfields, hangars and large workshops. By the end of the year six maintenance installations and a number of airfields with hangars had been built. Eight major flying meetings were held in 1950 and were attended by more than a million spectators.

At a congress of the A.U.J. held at Ruma in November, it was decided to recommend de-centralization of the aeronautical organization, so that administrative work could be reduced to a minimum. Under a new statute the formation of flying clubs is permitted "wherever the need exists"; in a later session it was decided to form aviation centres in the capitals of each of the national republics. At each centre there will be three schools which concentrate separately on powered flying, gliding and parachuting Technical facilitites will also be concentrated at each centre.

OLD STAGER: Certainly one of the last remaining specimens of its type still being operated, this Puss Moth was seen recently at Shoreham Airport on the occasion of the Sussex R.A.F. Open Day. G-AAZP was built at Edgware in 1930.

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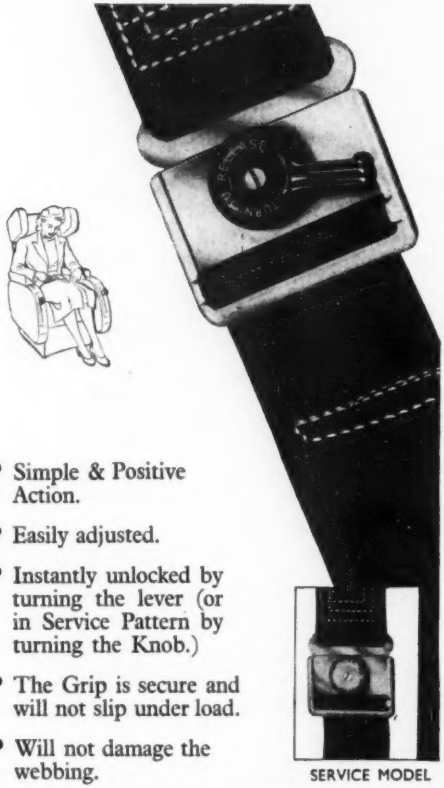

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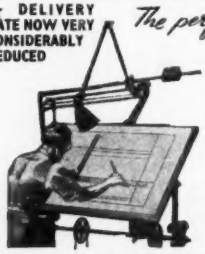

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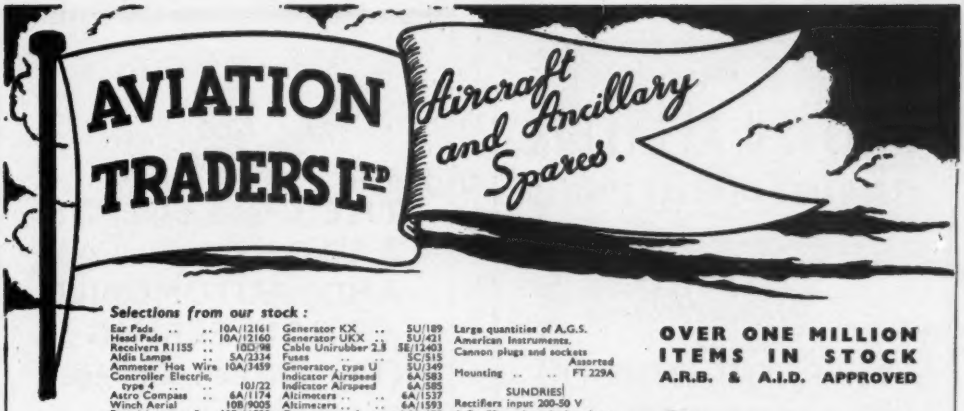

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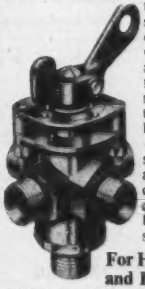

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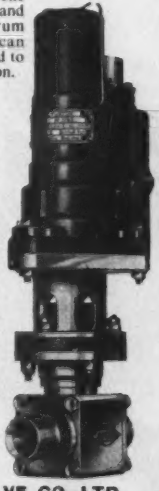

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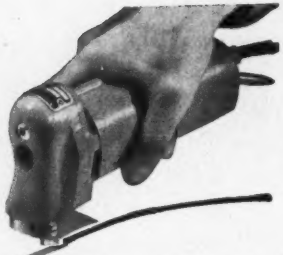

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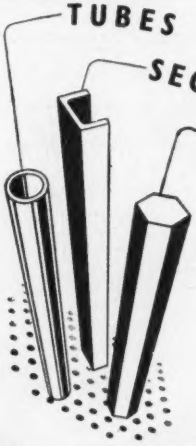

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